

Magellan Mapper

SERVICE MANUAL

rev2.4

CE
0123



Eye & Health Care

NIDEK TECHNOLOGIES Srl

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Manual information

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Table of contents

1	Introduction	4
2	Cautions	5
2.1	Before service	5
2.2	During service	5
3	Removal and replacement procedures.....	8
3.1	Removing the left head cover	9
3.2	Removing the right head cover	10
3.3	Replacing the head covers.....	11
3.4	Removing the front ring.....	12
3.5	Removing the head cover support bracket.....	13
3.6	Removing the optical head assembly.....	14
3.7	The optical head assembly replacement.....	17
3.8	Removing the moving base cover	18
3.9	Removing the chinrest	20
3.10	Removing the joystick	21
3.11	Removing the base plastic cover	24
3.12	Removing the base metallic cover	26
3.13	Removing cable plate MM2-ME126	28
3.14	Removing chinrest cable MM2-WI003	29
3.15	Insert the new chinrest cable MM2-WI019	31
3.16	Setup of micro switch and pin MM2_WI019 cable	33
3.17	Removing the plug of chinrest cable MM2-WI010.....	36
3.18	Assembly front cable support MM2-ME201	37
3.19	How replace MM2-WI010 cable with MM2-WI018 cable.....	38
3.20	Assembly rear support cable MM2-ME201	43
3.21	Lock chinrest cable MM2-WI018 to rear support cable	44
3.22	Connect two chinrest cable	47
4	New CCD Camera Videology 21D389-USB.....	50
5	HID & hub USB 2.0 Board.....	51
6	MAG-EL100 rev5	52
7	Replacement	54
8	Wiring.....	55
8.1	Cables List	55
8.2	Electronic Boards list.....	55
8.3	WD 1	56
9	Technical specifications	60
10	Tools.....	61
10.1	Special tools.....	61
10.2	Service tools set.....	61
11	Parts and assemblies list	62

1 Introduction

This service manual provides information for after-sales service of the Magellan Mapper.

Only a trained technician can replace any parts of Magellan Mapper.

For proper after-sale repair, it is necessary to understand this manual thoroughly before servicing.

Refer to the Magellan Mapper Operator's manual together with this manual.

Specifications are subject to change without notice for improvement.

In case the equipment cannot be repaired according to the procedure described in this manual, please contact us.

2 Cautions

2.1 Before service

Only service personnel, who are used to handling tools and are familiar with instrument, can perform the servicing.

Perform the servicing according to the procedures described in this manual. Before maintenance be sure to turn off the power switch and unplug the power cord.

Pay attention not to expose the inside of the instrument to water and not to perform the servicing with moist hand. This may cause an electric shock or a failure.

2.2 During service

In case the equipment produces smoke, turn off the power switch immediately, and disconnect the power plug from the wall outlet.

Do not lose or drop screws, parts, etc. inside the equipment.

During an electrical storm, do not connect or disconnect cables.

Location

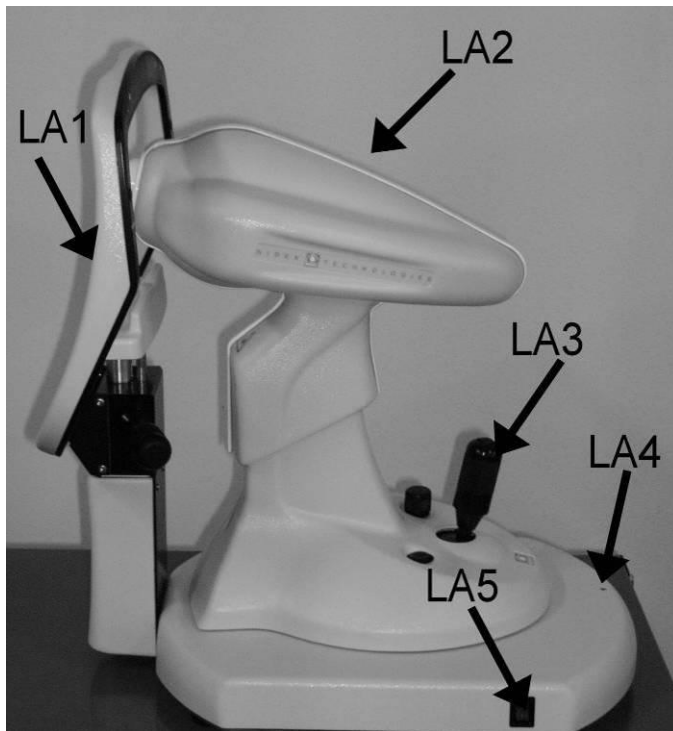


Figure 1 Location A

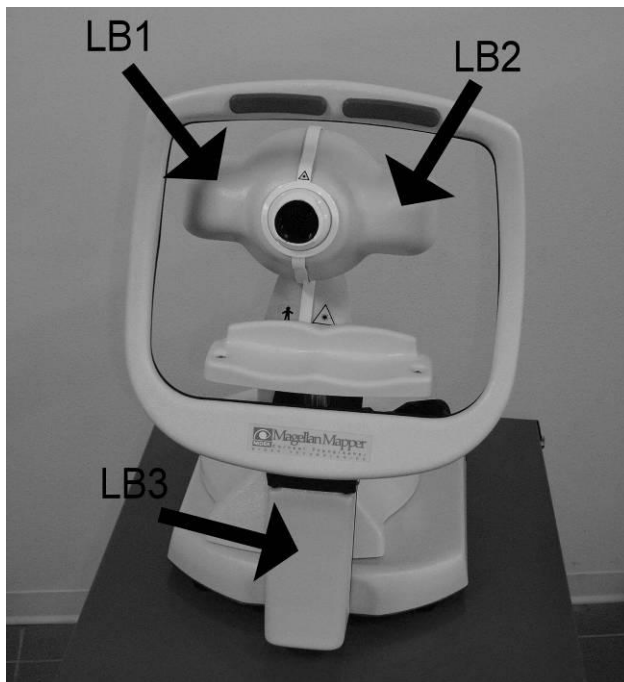


Figure 2 Location B

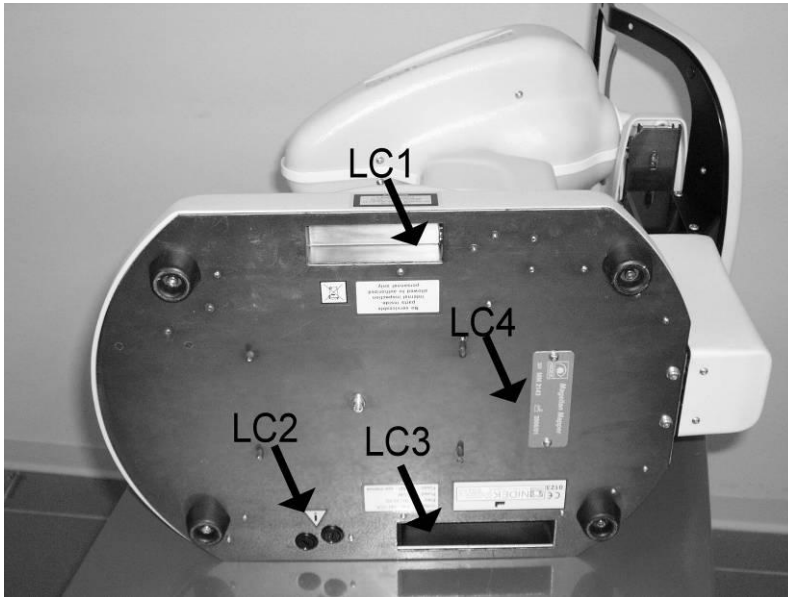


Figure 3 Location C

Location table

LA1: Chinrest
LA2: Optical Head
LA3: Joystick
LA4: Power led
LA5: Power Switch
LB1: Left head cover
LB2: Right head cover
LB3: Chinrest base cover
LC1: USB connector
LC2: Fuses
LC3: Power inlet
LC4: S/N label

3 Removal and replacement procedures

Retain removed parts for the replacement procedures.

Take note of wiring and connectors of the removed part.

Reconnect in the same way the removed part.

Turn upside down the equipment only when indicated by the procedure.

Disconnect the signal cables, the power cables and the ground connections, from the parts to be removed.

Replacement

Replace in reverse order, every removal procedures.

3.1 Removing the left head cover

Remove the two screws (see Figure 4).



Figure 4 the left head cover screws.

Remove the left head cover (see Figure 5).



Figure 5 the left head cover.

3.2 Removing the right head cover

Remove the two screws (see Figure 6)



Figure 6 the right head cover screws.

Remove the right head cover (see Figure 7).



Figure 7 the right head cover.

3.3 Replacing the head covers

To replace the two head covers, insert the two retainers of the optical head (see Figure 8) into each head cover dedicated slot (see Figure 9).

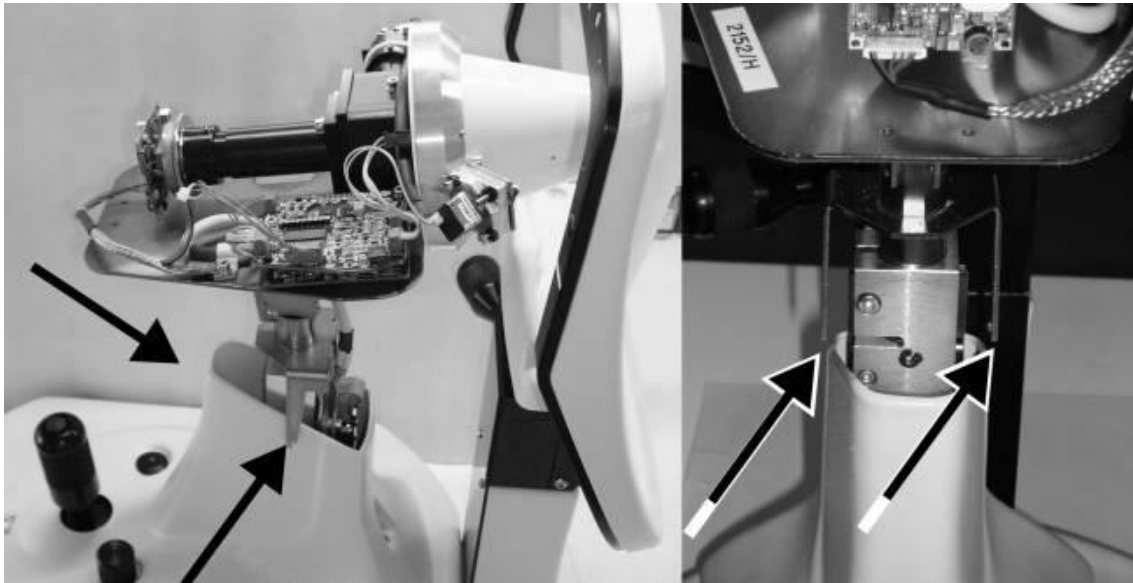


Figure 8 the head cover retainers.



Figure 9 the cover retainer insertion slot.

3.4 Removing the front ring

Before proceeding, remove the left and right head covers (see procedures no. 4.1, and 4.2).

The front ring is jointed (see Figure 10).

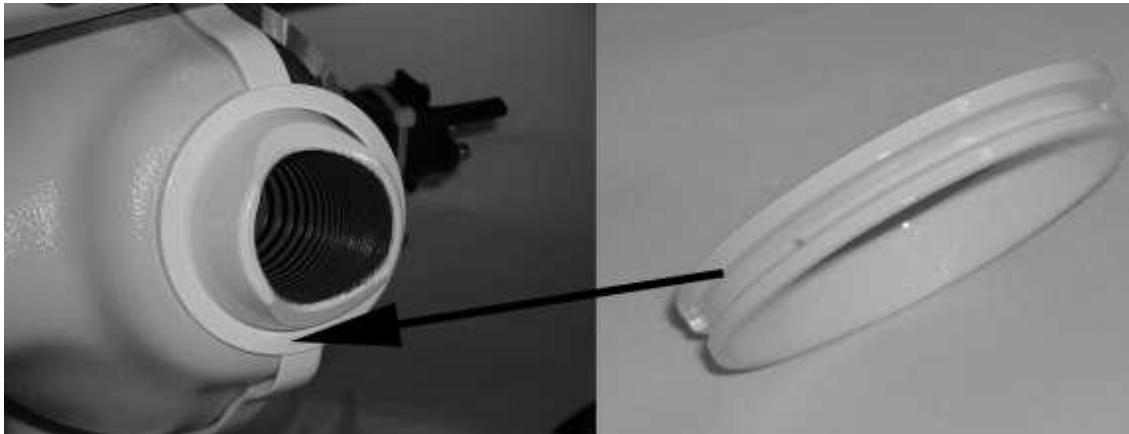


Figure 10 the Front ring.

3.5 Removing the head cover support bracket.

Before proceeding, perform the procedures no. 4.1, 4.2. 4.4.

The support bracket is divided in two parts: A, B (see Figure 11).

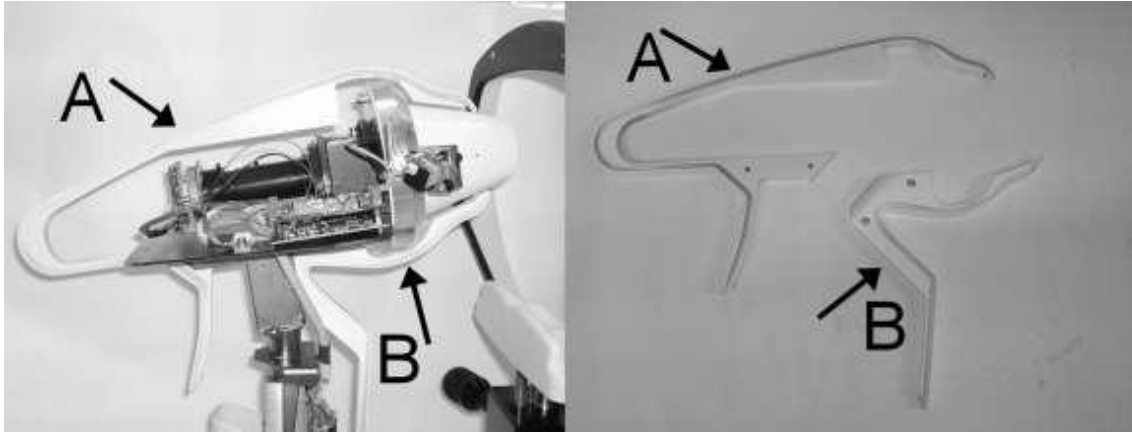


Figure 11 the head cover support bracket.

Remove the four screws and the four nuts (see Figure 12).



Figure 12 the four screws of support bracket.

3.6 Removing the optical head assembly

Before proceeding, perform the procedures no. 4.1, 4.2, 4.4, 4.5.

Unscrew the screw S.

Pay attention at the connectors C. (See Figure 13)

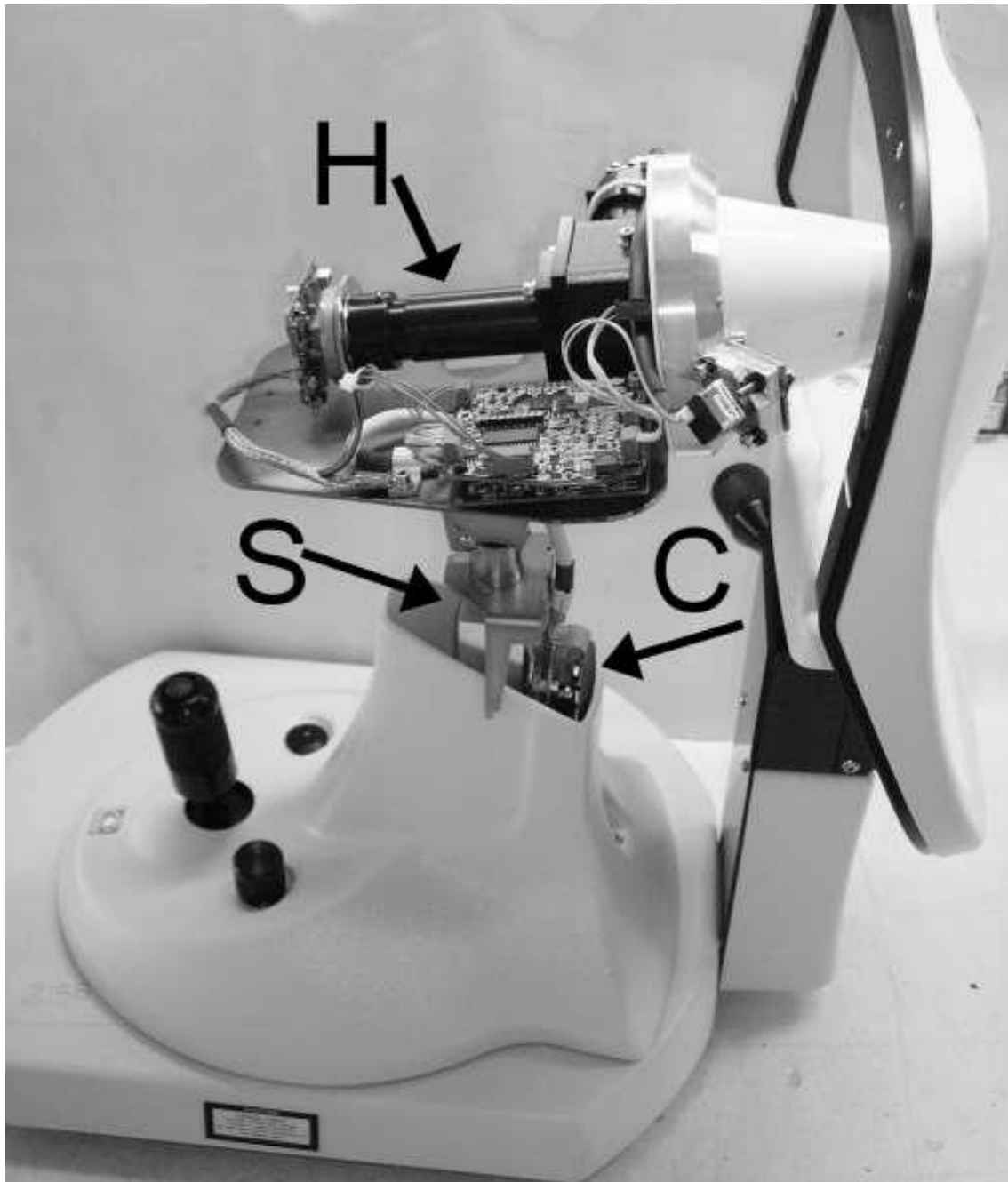


Figure 13 the Optical head before removing.

Remove the optical head assembly H (see Figure 14).



Figure 14 the optical head assembly.

When you unscrewing the screw S, avoid the screw falls inside the equipment (see Figure 15). Please remove it.



Figure 15 the S screw: it holds the head.

3.7 The optical head assembly replacement

When you replace the optical head, pay attention at the connection of electrical contacts (see Figure 16).

A= optical head contacts.

B= equipment contacts on the base.

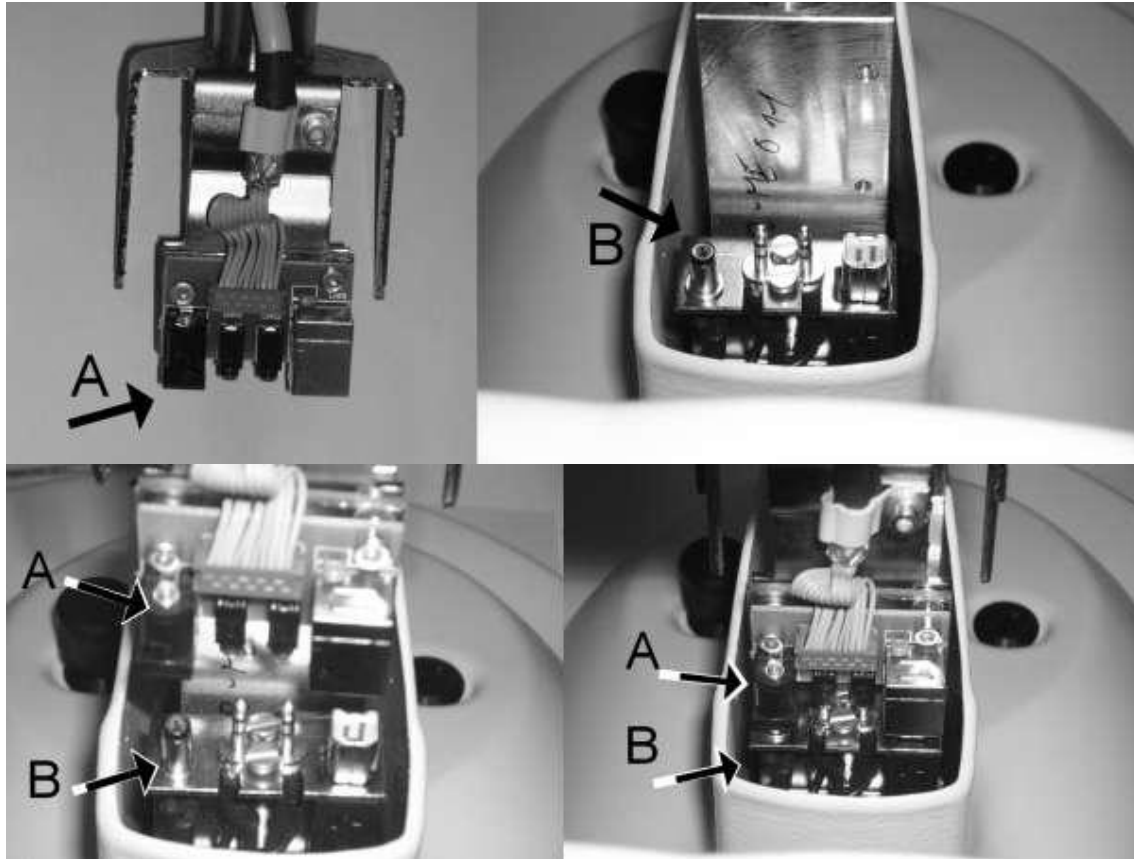


Figure 16 How to insert the connectors.

3.8 Removing the moving base cover

Before proceeding, perform the procedures no. 4.1, 4.2, 4.4, 4.5, 4.6.

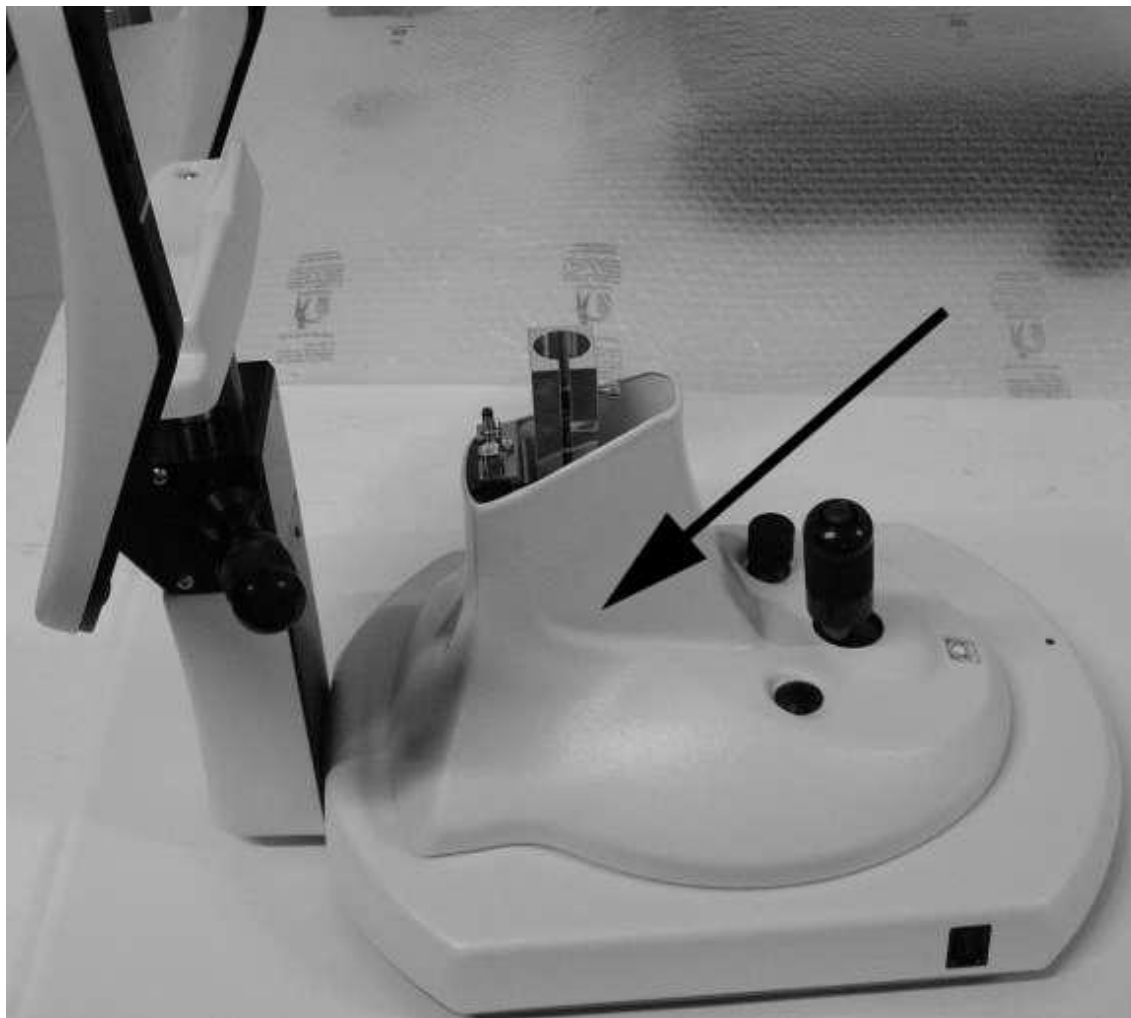


Figure 17 the moving base cover installed.

Loosen the setscrew S, and remove the knob K (see Figure 18).

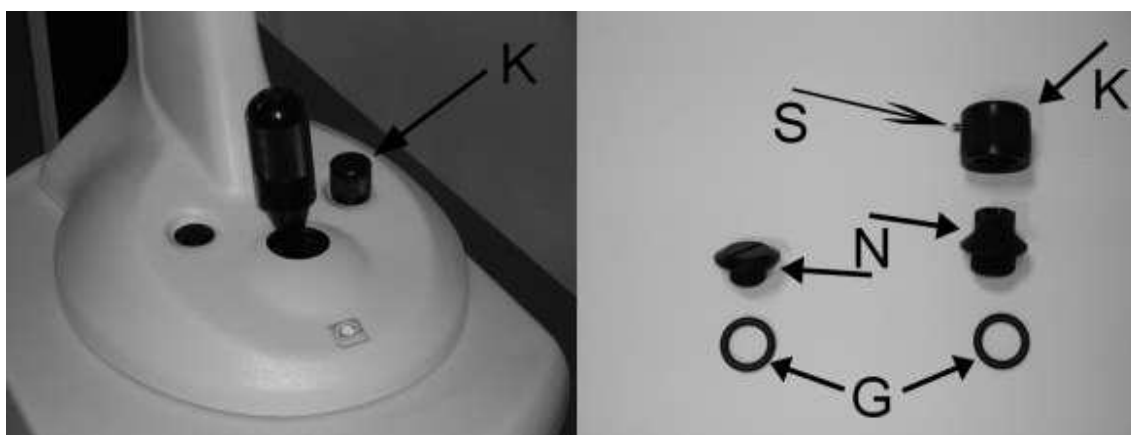


Figure 18 the knob of moving cover.

Remove the two nuts N, and the screw T (see Figure 19).
The nuts are held to the cover with two grommets G.

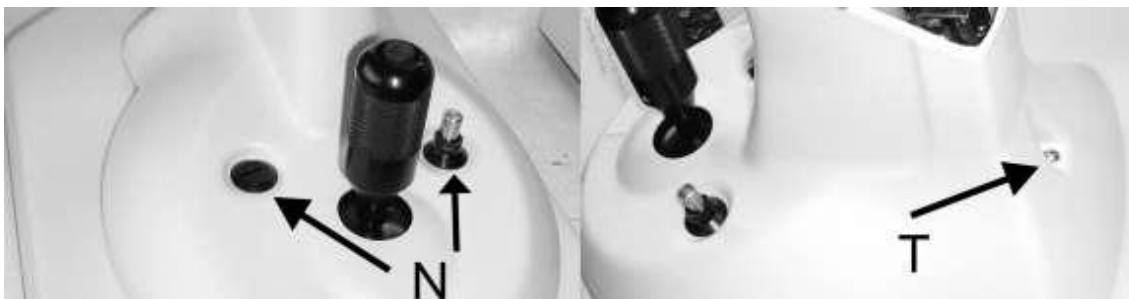


Figure 19 the nuts and screw of moving cover.

Remove the moving base cover (see Figure 20).



Figure 20 the moving base cover.

3.9 Removing the chinrest

Unscrew the two screws of the base cover of the chinrest (see Figure 21).



Figure 21 the two screws of chinrest base cover.

Remove the base cover of chinrest (see Figure 22).

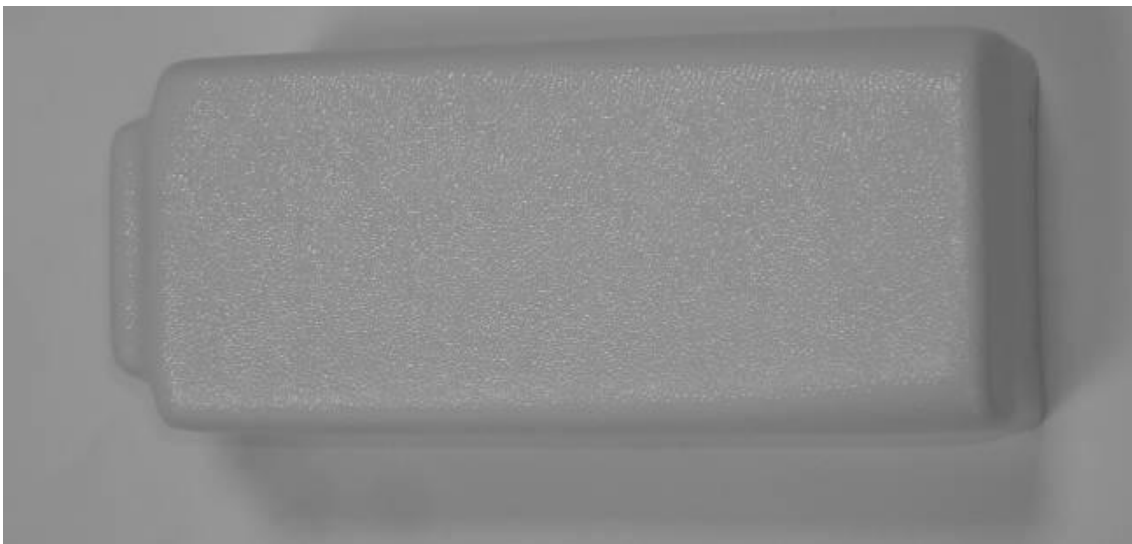


Figure 22 the chinrest base cover.

3.10 Removing the joystick

Before proceeding, perform the procedures no. 4.1, 4.2, 4.4, 4.5, 4.6, and 4.8. Unscrew the four screws S1, S2, S3, and S4 and remove the belt stretcher BT (see Figure 23).

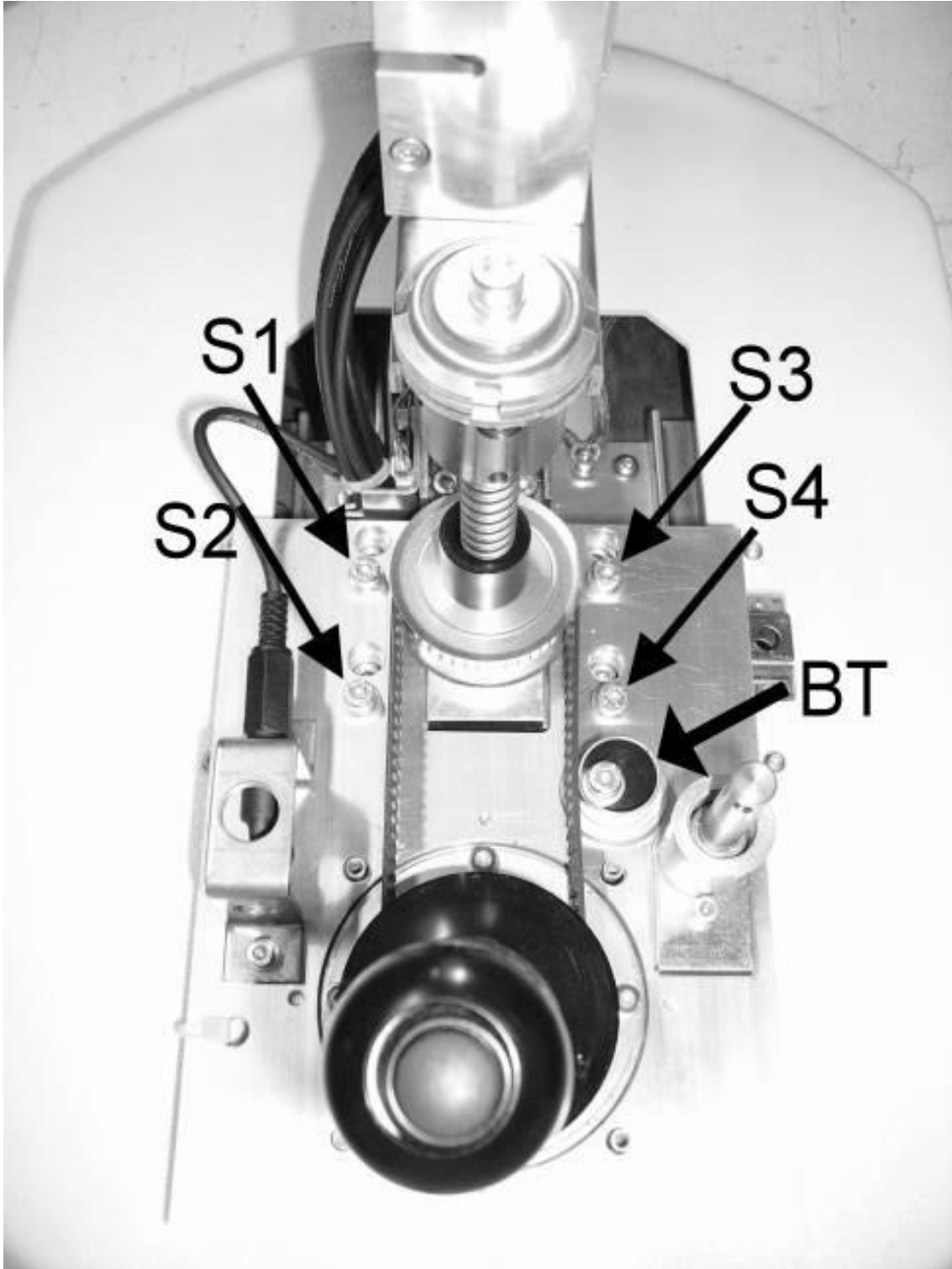


Figure 23 the four screws and belt stretcher.

Before to remove the joystick, remove the plug P (see Figure 25) from the jack (see Figure 24).

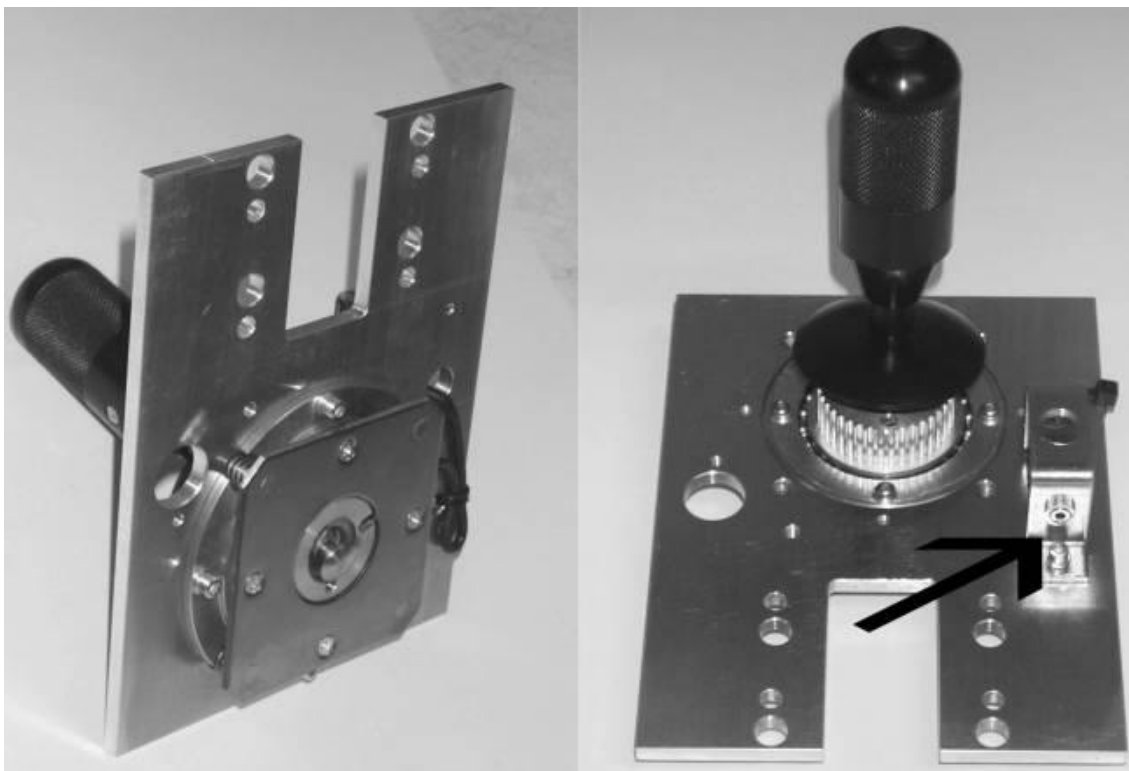


Figure 24 the joystick.

Pay attention when you remove the belt B, do not force and damage it.
(see Figure 25).

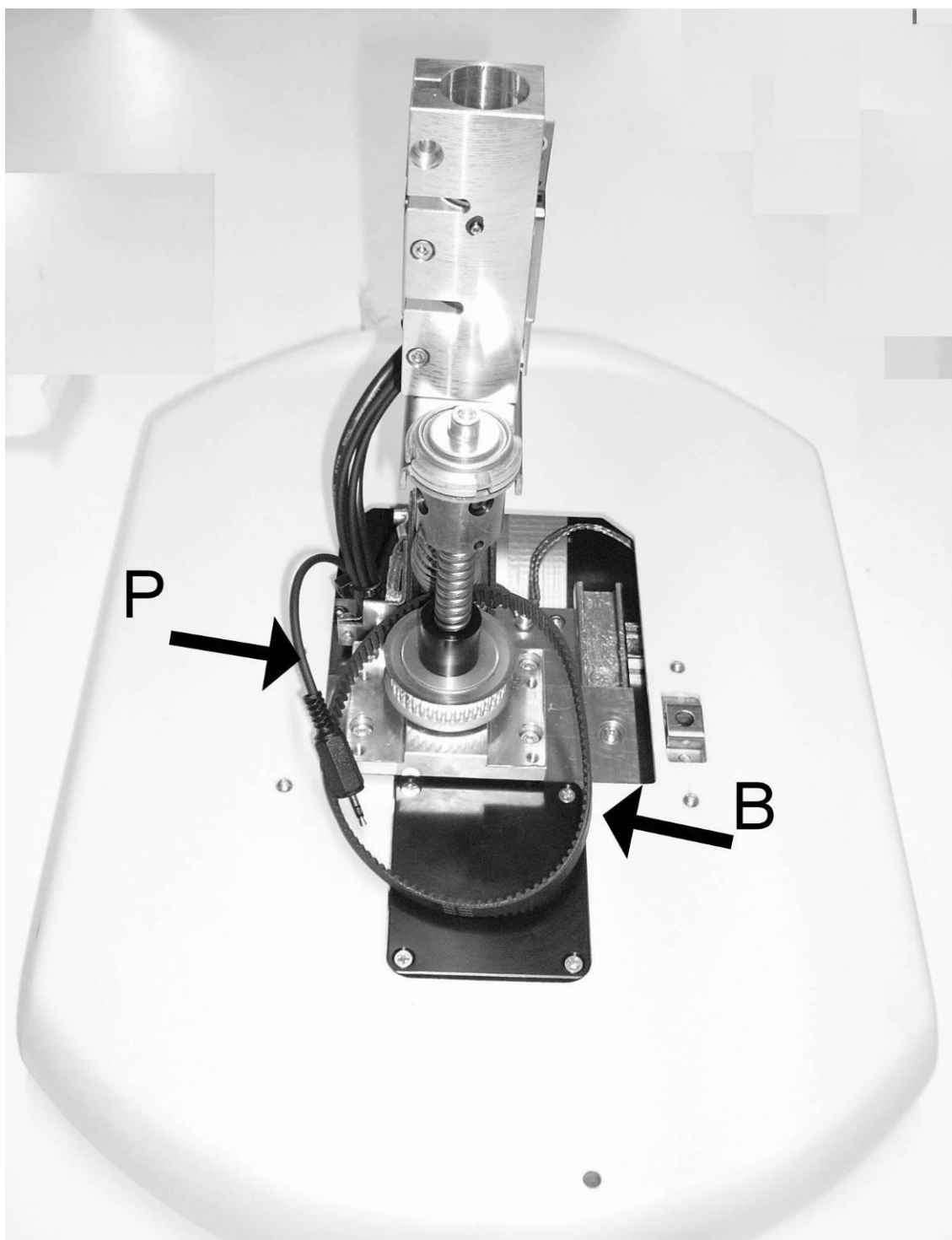


Figure 25 the joystick plug and belt.

3.11 Removing the base plastic cover

If you have not already done, perform the procedures no. 4.1, 4.2, 4.4, 4.5, 4.6, 4.8, and 4.10.

Unscrew the five screws (see Figure 26).

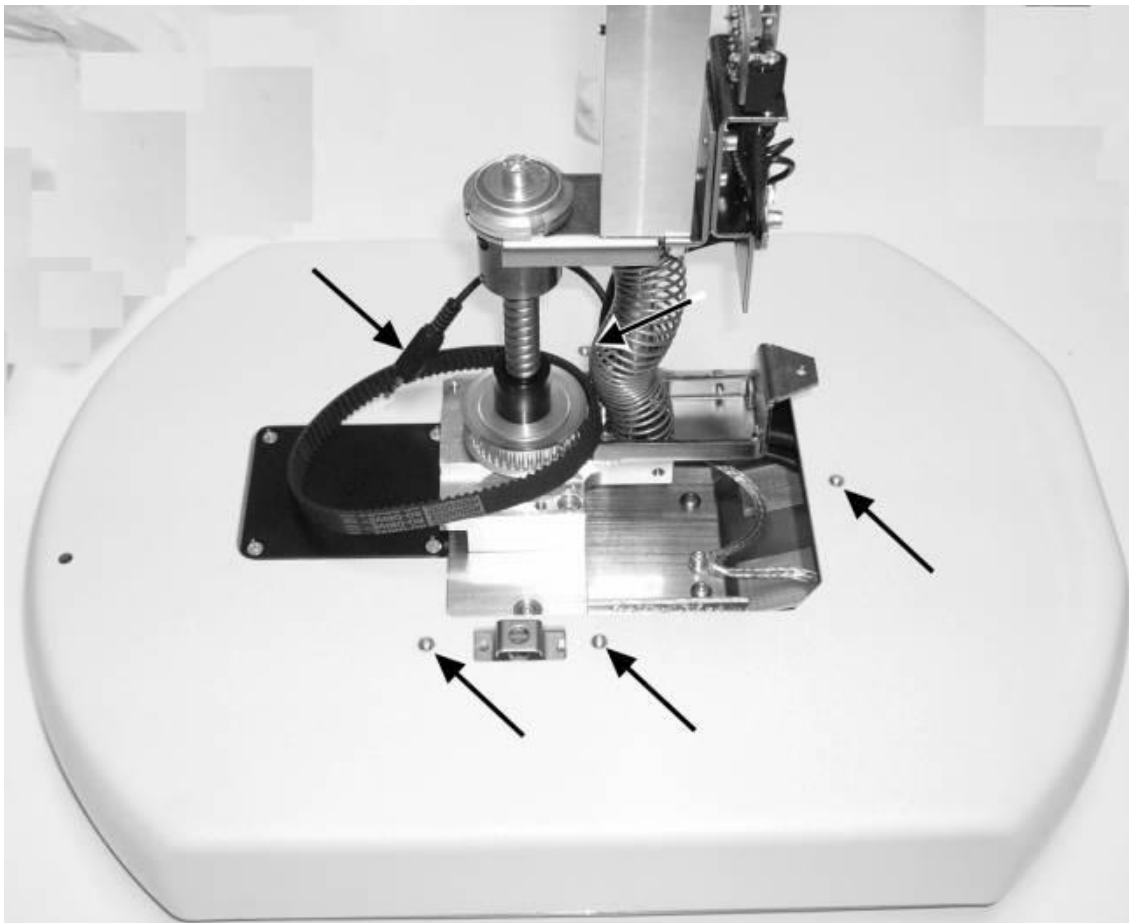


Figure 26 the five screws of plastic base cover.

Remove the plastic base cover (see Figure 27).

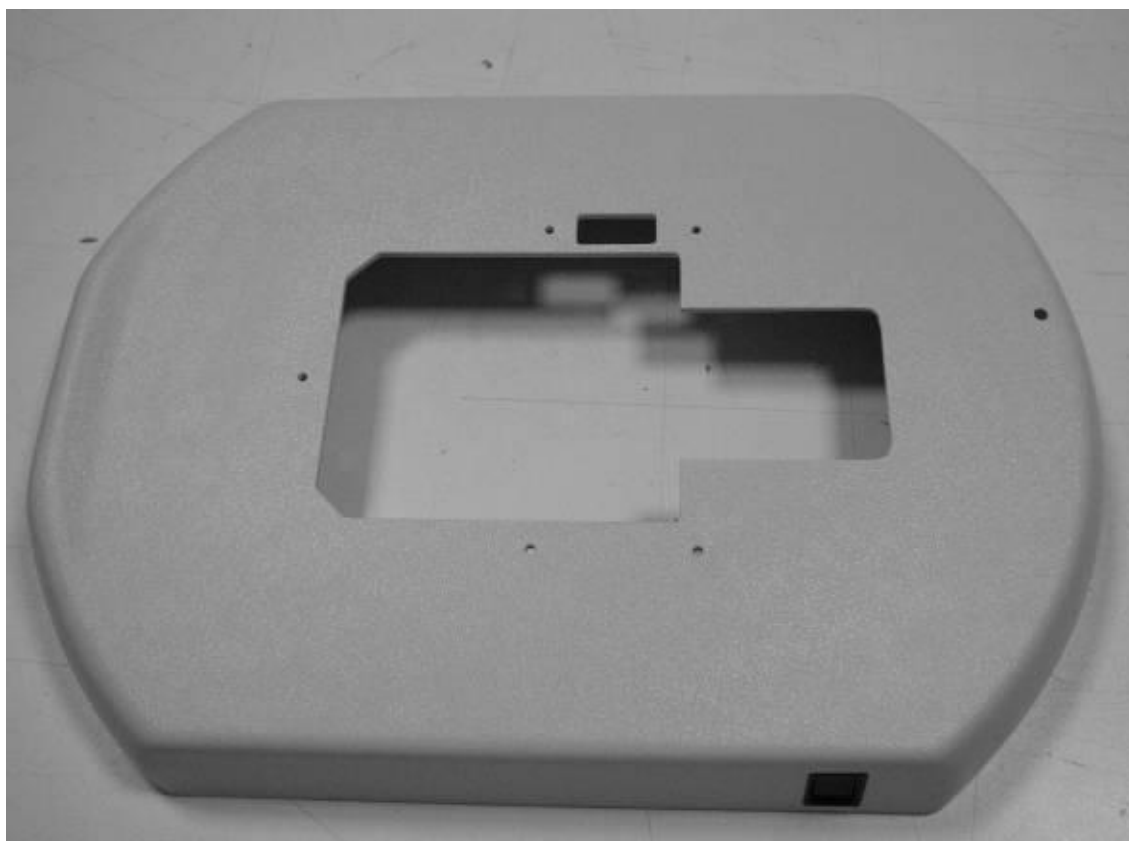


Figure 27 the plastic base cover.

3.12 Removing the base metallic cover

Before proceeding, perform the procedures no. 4.1, 4.2, 4.4, 4.5, 4.6, 4.8, 4.10, and 4.12.

Unscrew the twelve screws (see Figure 28).

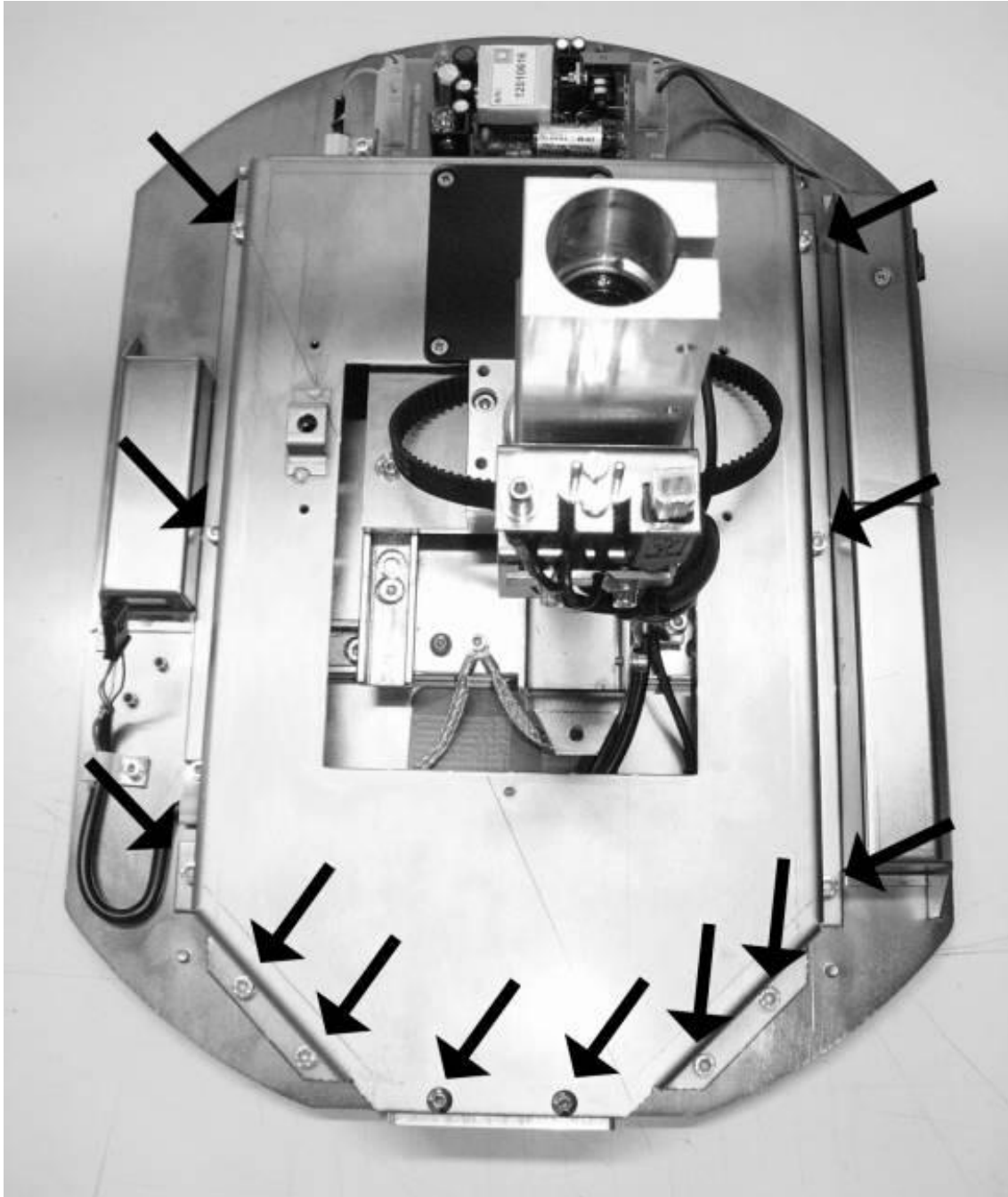


Figure 28 the twelve screws of metallic base cover.

Remove the metallic base cover (see Figure 29).

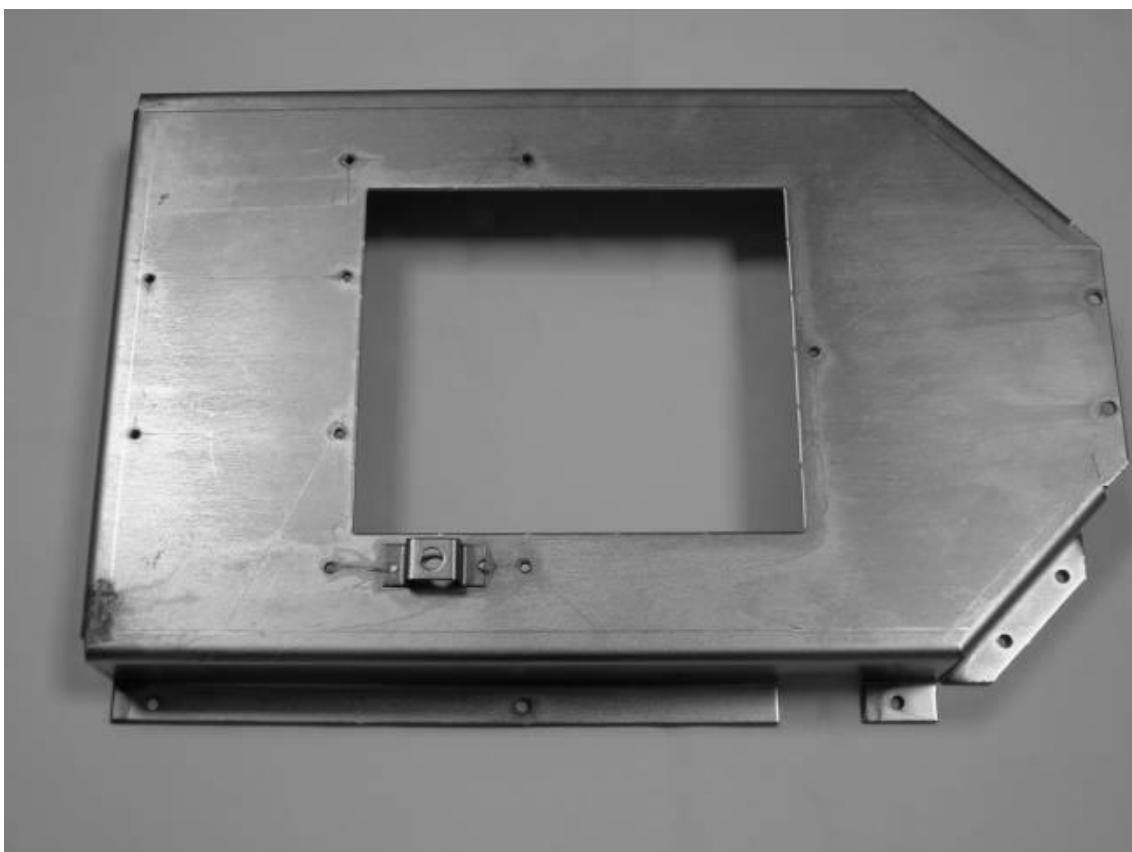


Figure 29 the metallic base cover.

3.13 Removing cable plate MM2-ME126

Before proceeding, perform the procedures no. 4.1, 4.2, 4.4, 4.5, 4.6, 4.8, 4.10, and 4.12.

Unscrew the two screws (see Figure 30).

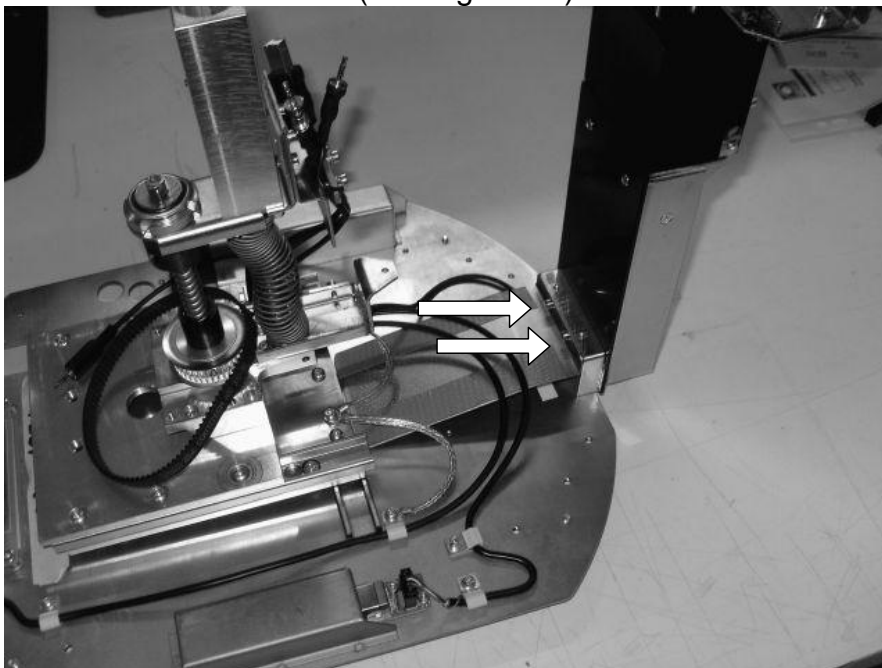


Figure 30 View of the base

3.14 Removing chinrest cable MM2-WI003

Unscrew one screw and remove the plug (see Figure 31).

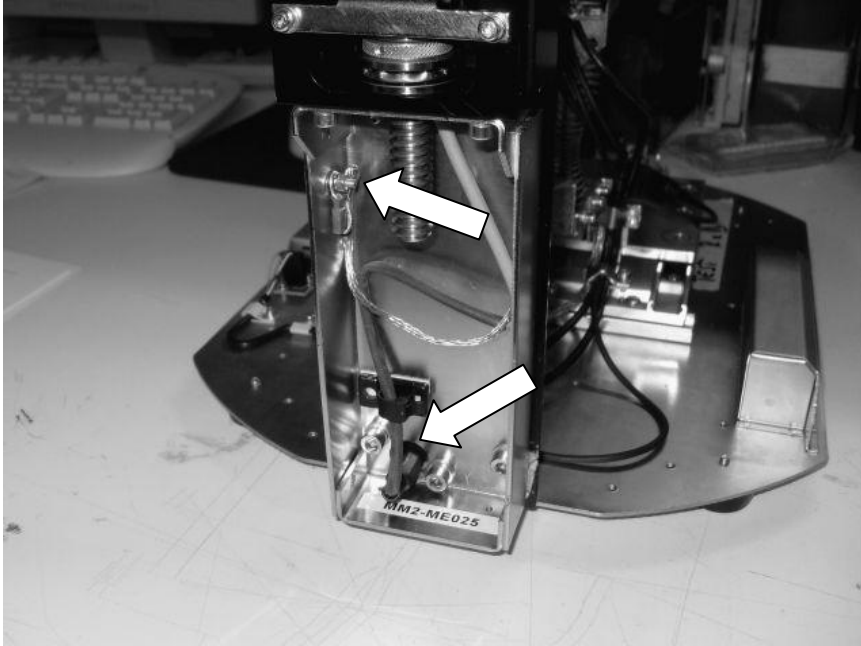


Figure 31 Chinrest support

Unscrew the five screws (see Figure 32)

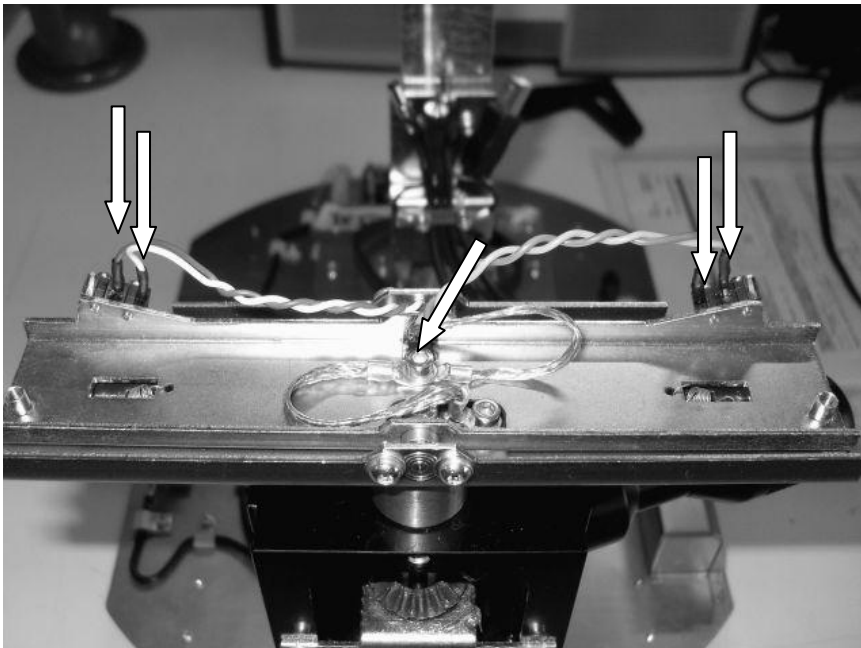


Figure 32 Chinrest mechanism

Cut the cable MM2-WI003 near the plug and remove the cable from the chinrest (see Figure 33)

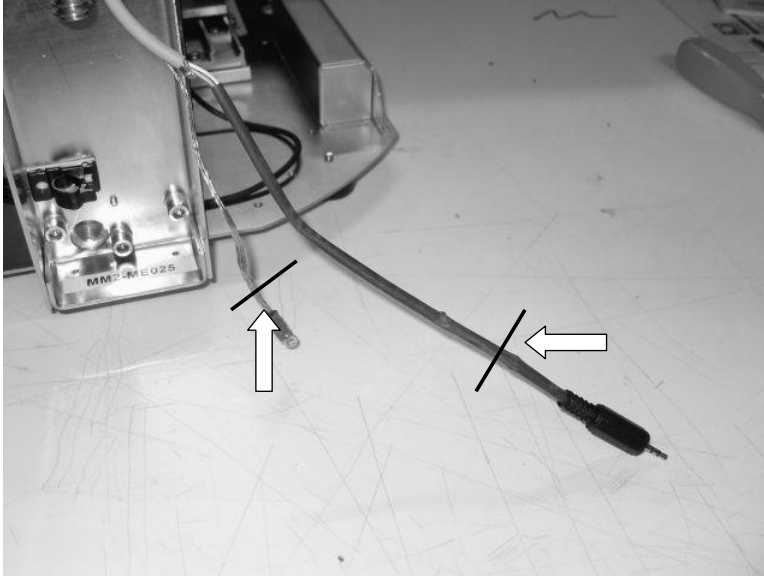


Figure 33 MM2-WI003 cable

3.15 Insert the new chinrest cable MM2-WI019

- Move to the lower position the chinrest (see Figure 34)
- Insert the cable in to the hole (see Figure 34)

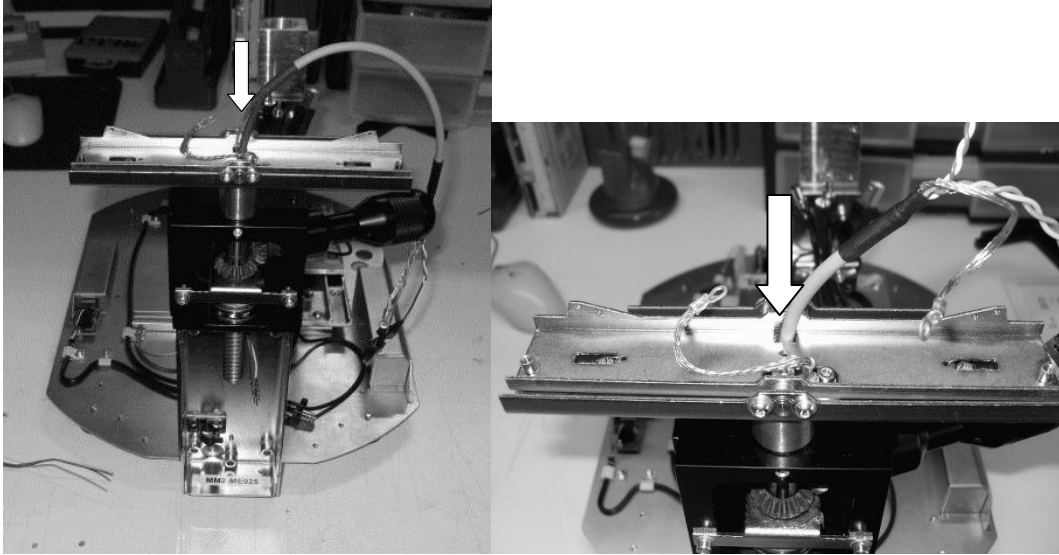


Figure 34 chinrest and MM2 WI019 cable

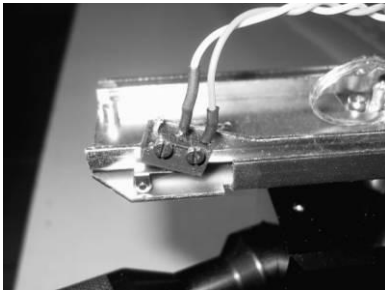


Figure 35

Positions the micro switch like the Figure 35

Pay attention to the color cable (see Figure 36), screw the four screw (See Figure 36)

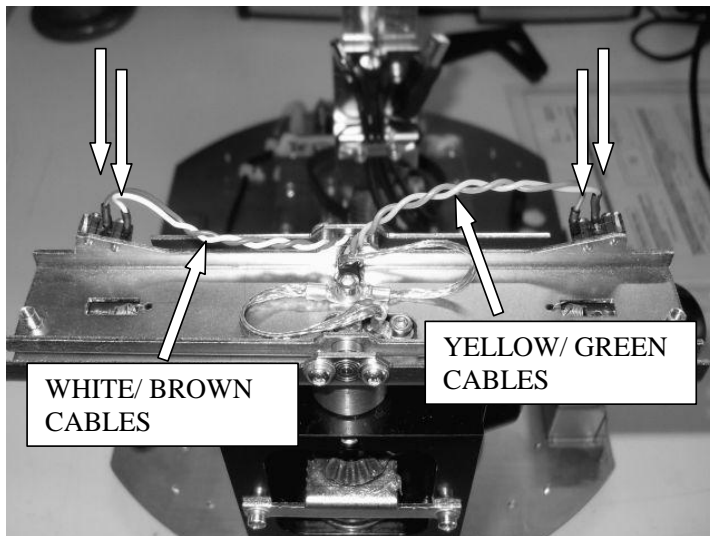


Figure 36 Position of micro switch

Place the shield of the cable in the central position and screw the central screw (central screw: screw M3X6 + spring lock washer + plain washer) (see Figure 37)

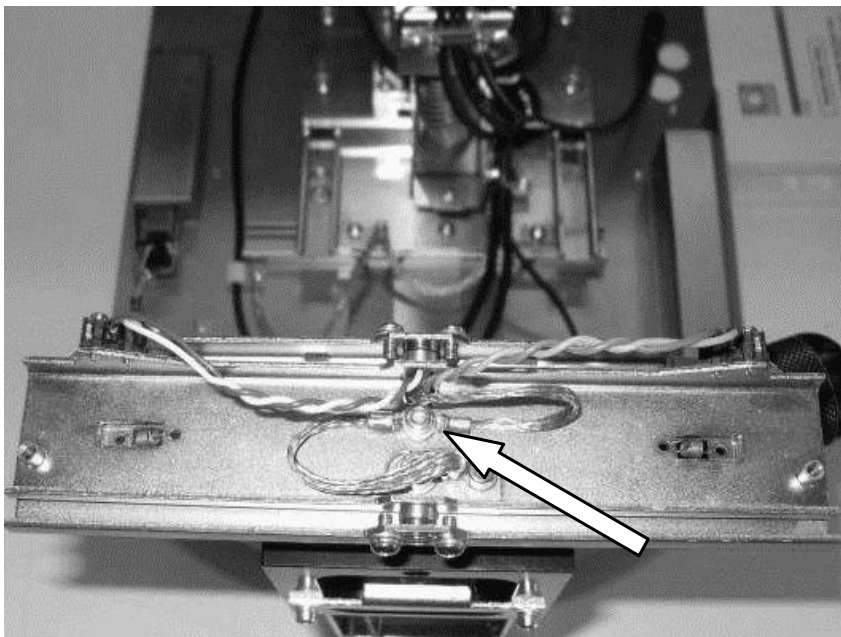


Figure 37 Chinrest

3.16 Setup of micro switch and pin MM2_WI019 cable

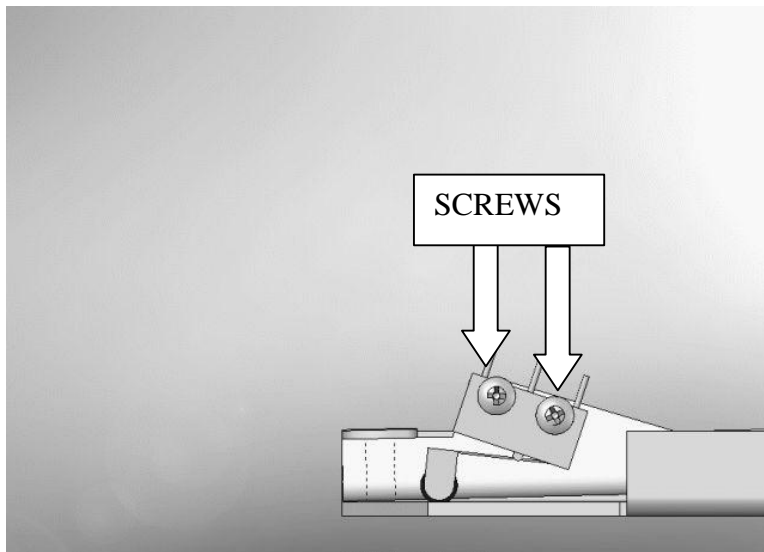


Figure 38 down position of micro switch

Set of micro switch

Unscrew the two screws and set the position of micro switch, after, screw the two screws (see Figure 38).

Bottom position:

When the micro switch is active/on (click sound when you move down)

$L=0.8\text{mm}$ (see Figure 39)

Pay attention: when one micro switch is ON other micro switch OFF (see Figure 40)

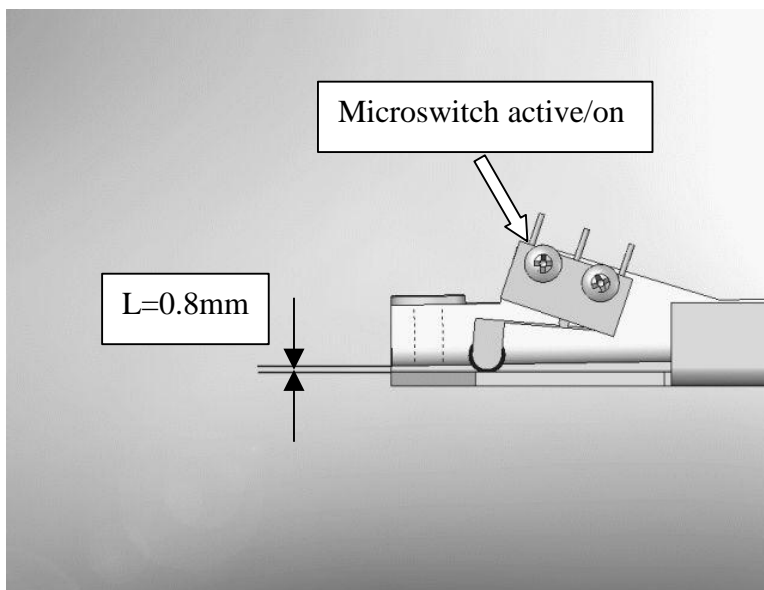


Figure 39

Central position:

When the micro switch is inactive/OFF (click sound) when you move in the central position (see Figure 41)

In the central position all micro switch is OFF (see Figure 41)

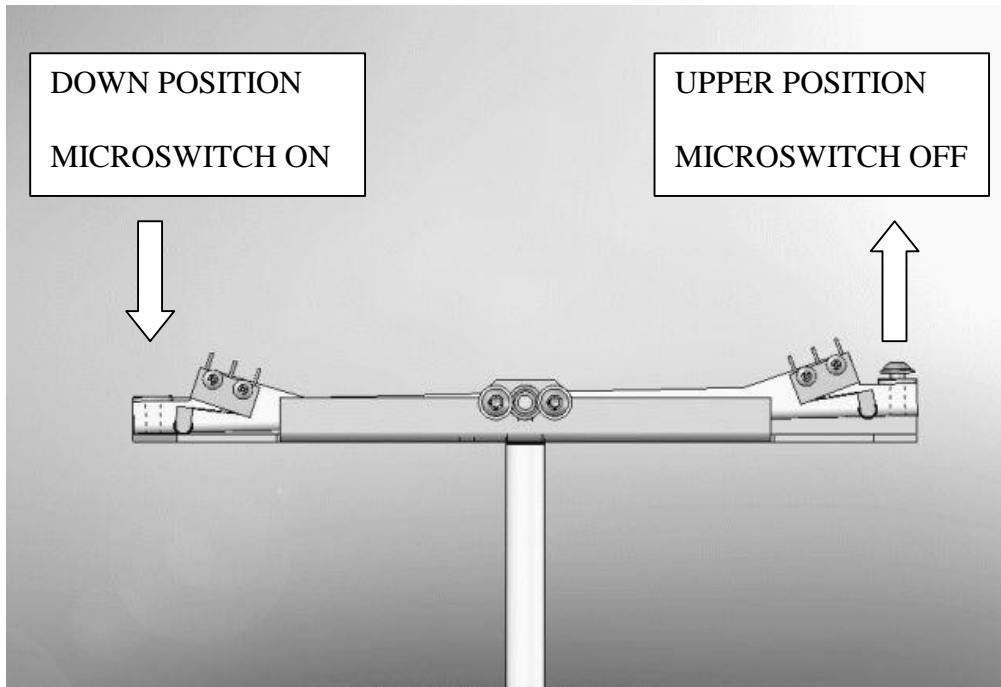


Figure 40 Chinrest

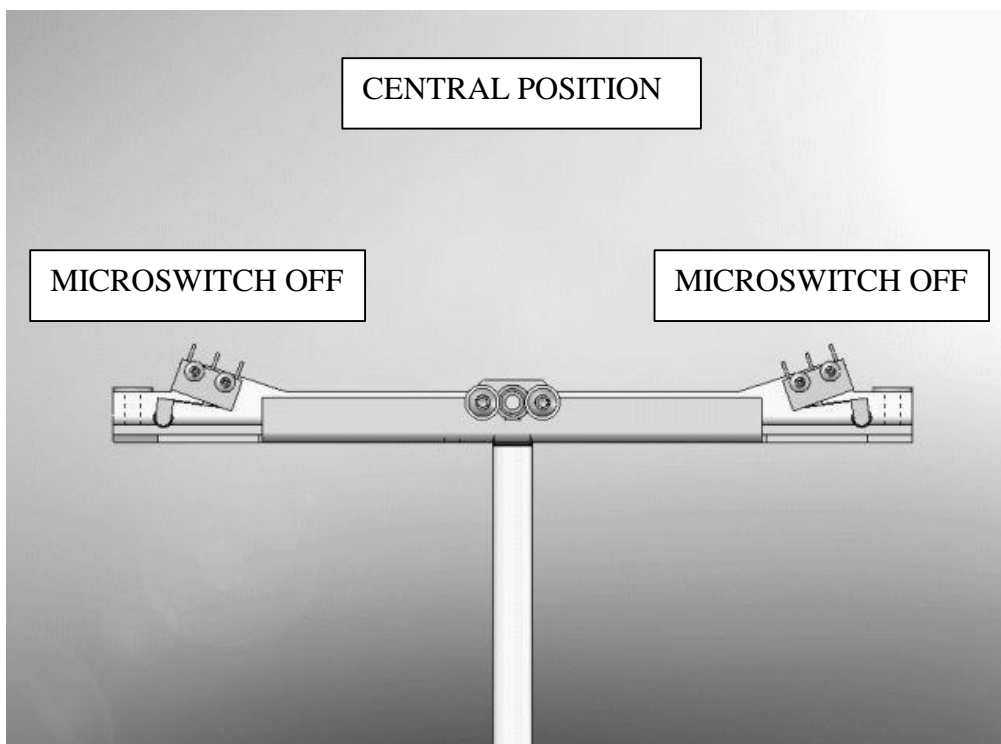


Figure 41 Central position of micro switch

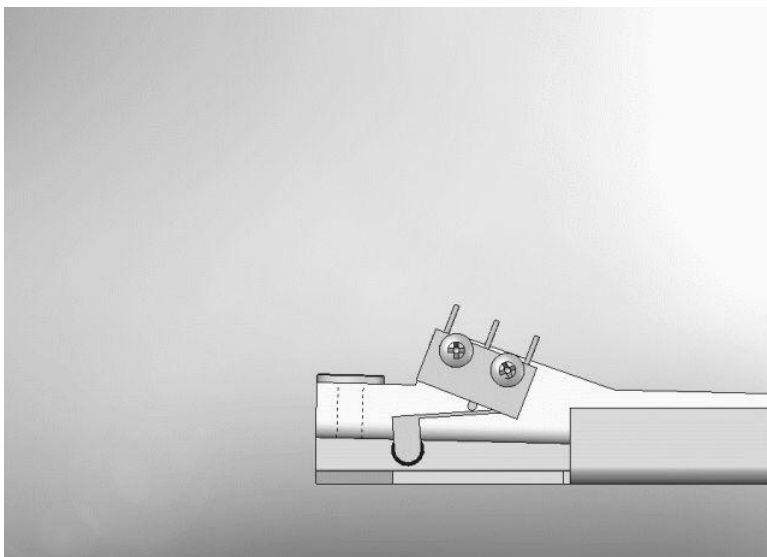


Figure 42 Upper position of micro switch (OFF)

Pin of MM2-WI019 (see Figure 42)

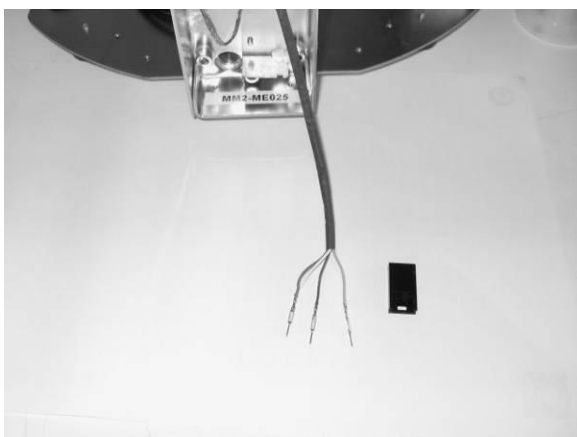


Figure 43 CN1 of MM2-WI019

Insert the pin in the Amp MODU housing (see Figure 44)

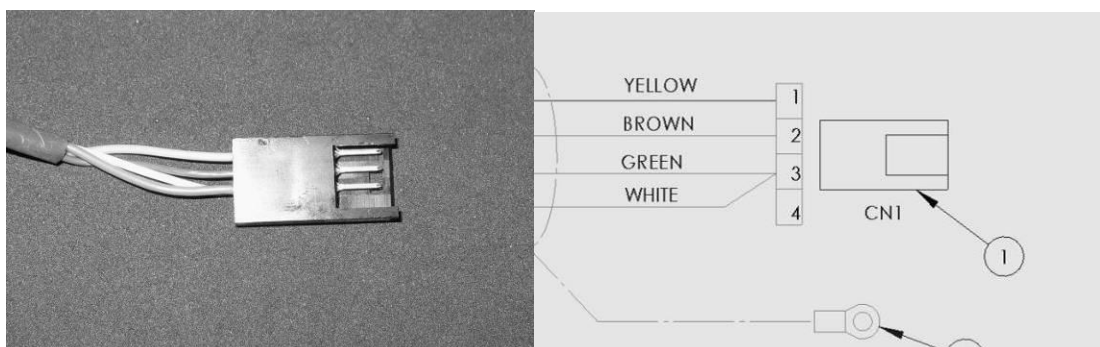


Figure 44 Connector CN1 of MM2-WI019

3.17 Removing the plug of chinrest cable MM2-WI010

Unscrew the ring of plug (see Figure 45)
Remove the tie mount cable

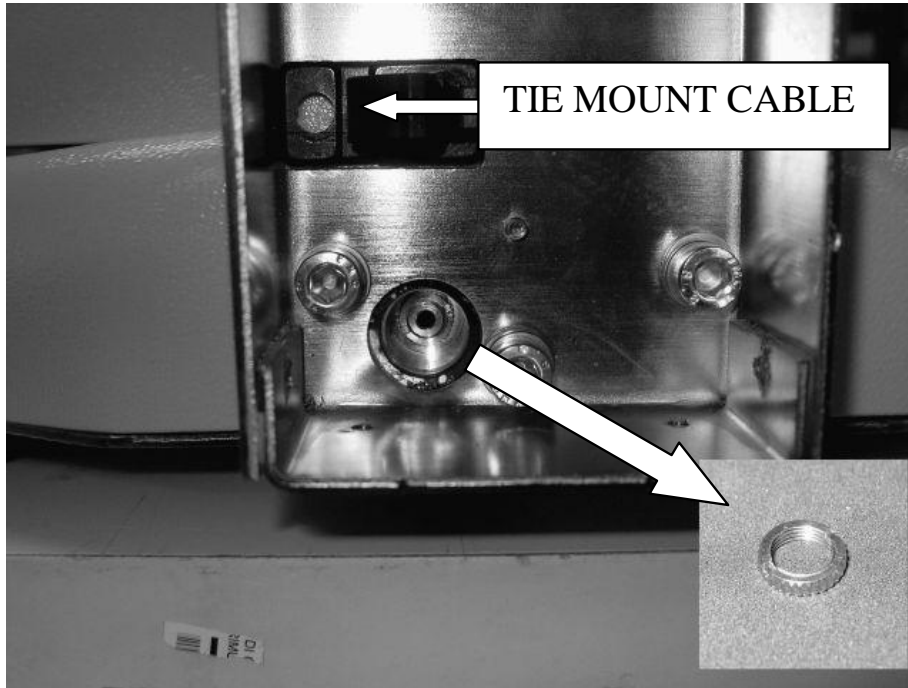


Figure 45

3.18 Assembly front cable support MM2-ME201

Unscrew the screw M5X16 show in the Figure 46

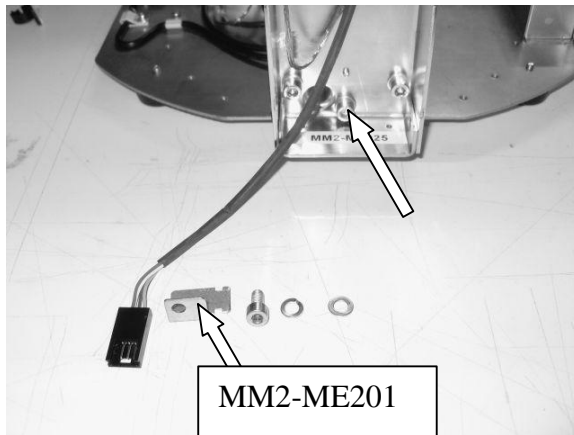


Figure 46 MM2-ME201 and screw

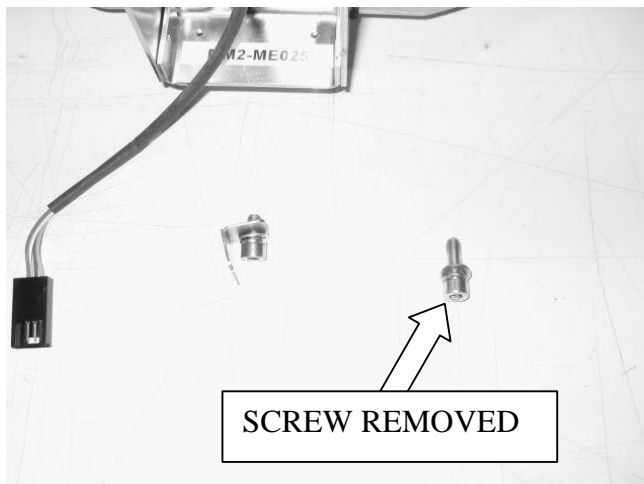


Figure 47 MM2-ME201 and screw

Assembly the cable support with M5X10 screw, lock washers and plain washer (see Figure 47 and Figure 48)

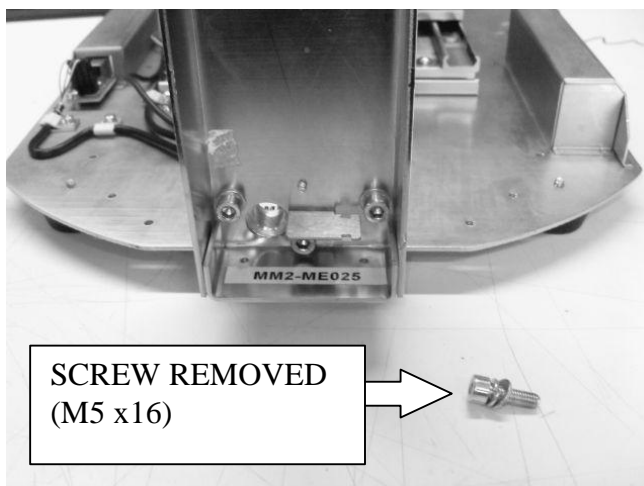


Figure 48 Chinrest support

3.19 How replace MM2-WI010 cable with MM2-WI018 cable

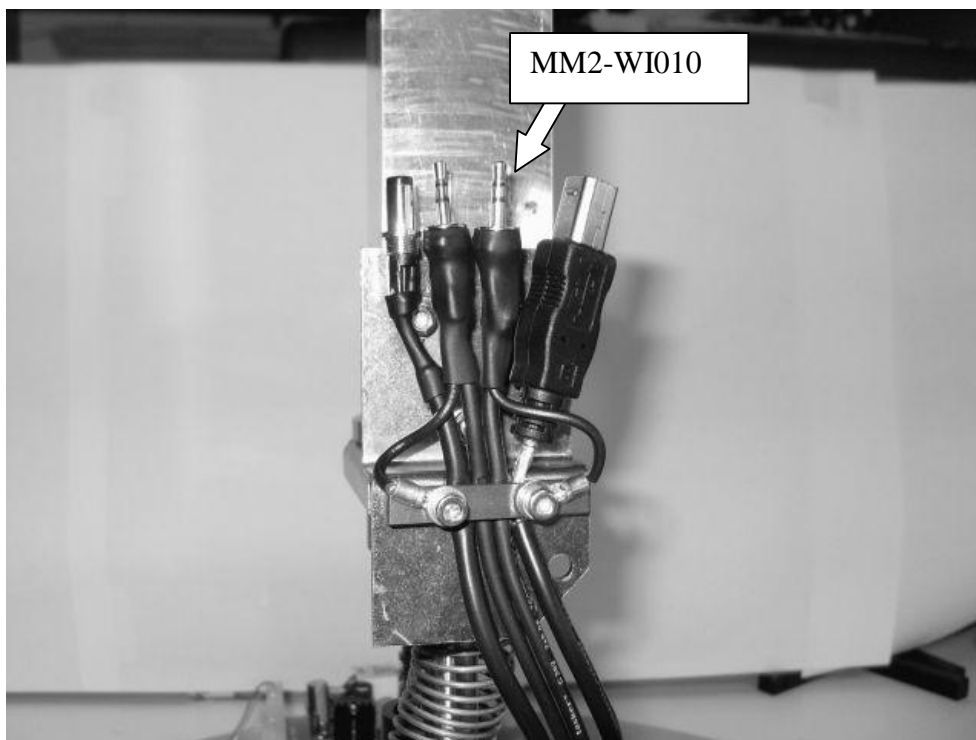


Figure 49 cable near the Head

Remove MM2-WI010 cable (see Figure 50)



Figure 50 MM2-WI010 removed

Insert MM2-WI018 cable (see Figure 51)

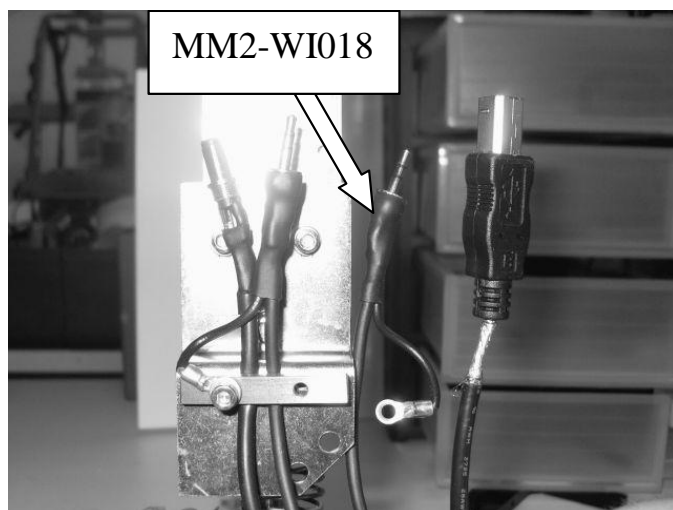


Figure 51

Place the cable as in Figure 52 and Figure 53 and fix the shield with the screw
Pay attention of the height of the cables (see Figure 53)

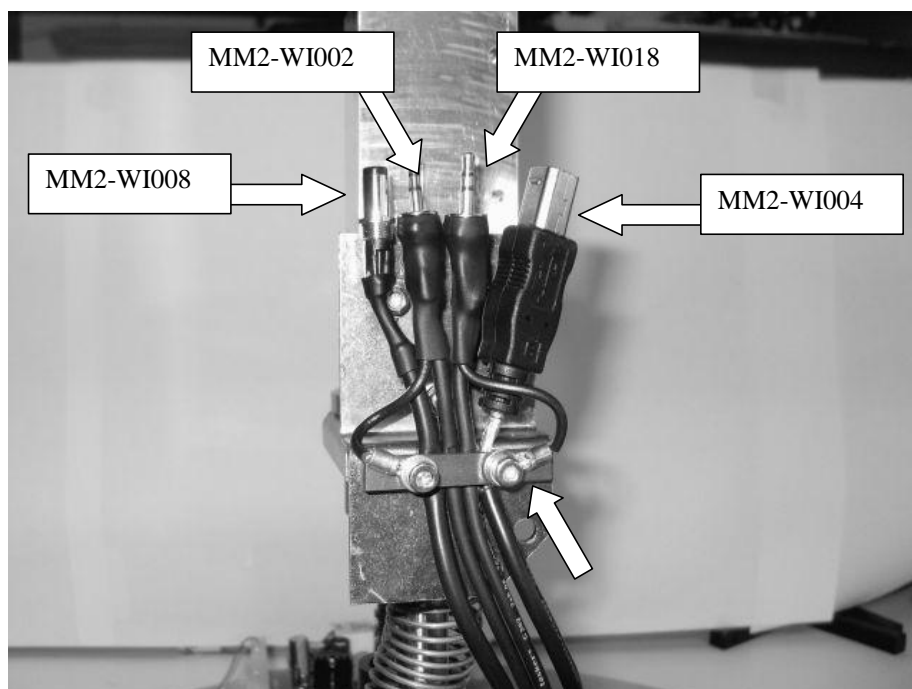


Figure 52

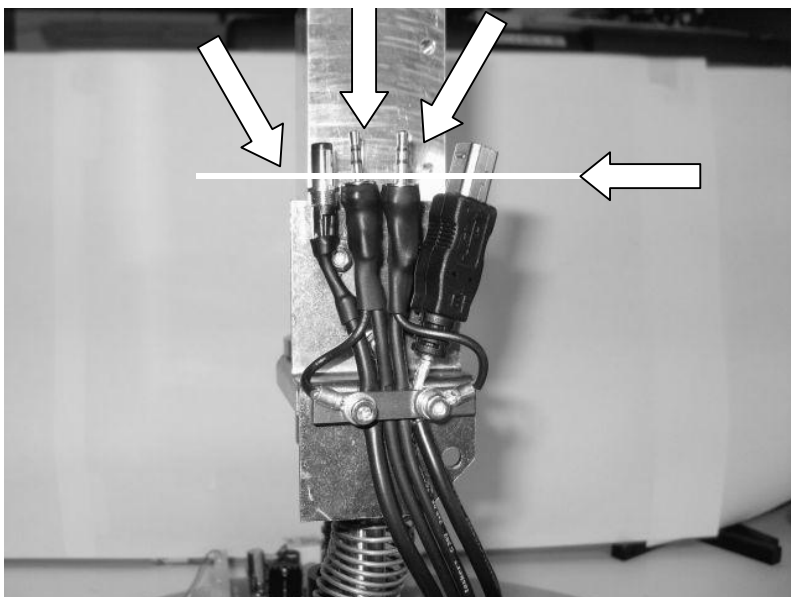


Figure 53

Unscrew two screw “S” and remove MM2-WI010 (see Figure 54)

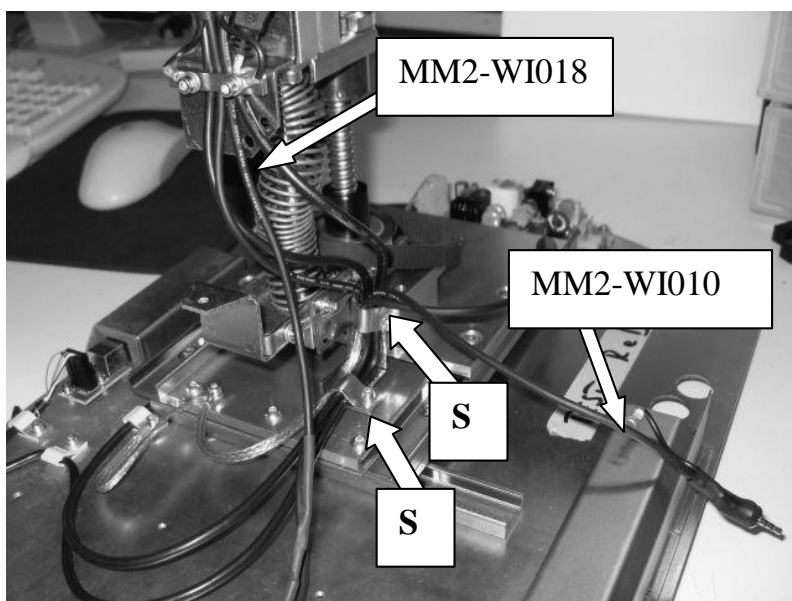


Figure 54

Pay attention of the length of the cables (see Figure 55 and Figure 56)

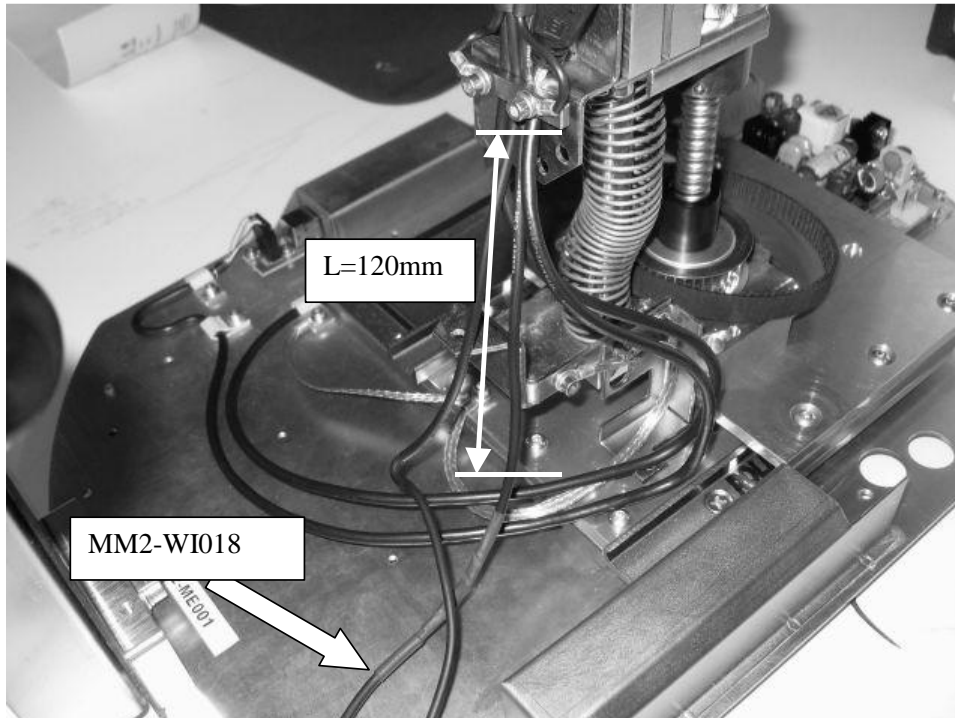


Figure 55 Length of cable

Assembly the cable tie and lock MM2-WI002, MM2-WI004, MM2-WI008, MM2-WI018 (see Figure 55, Figure 56)

Screw the screw show in the Figure 56

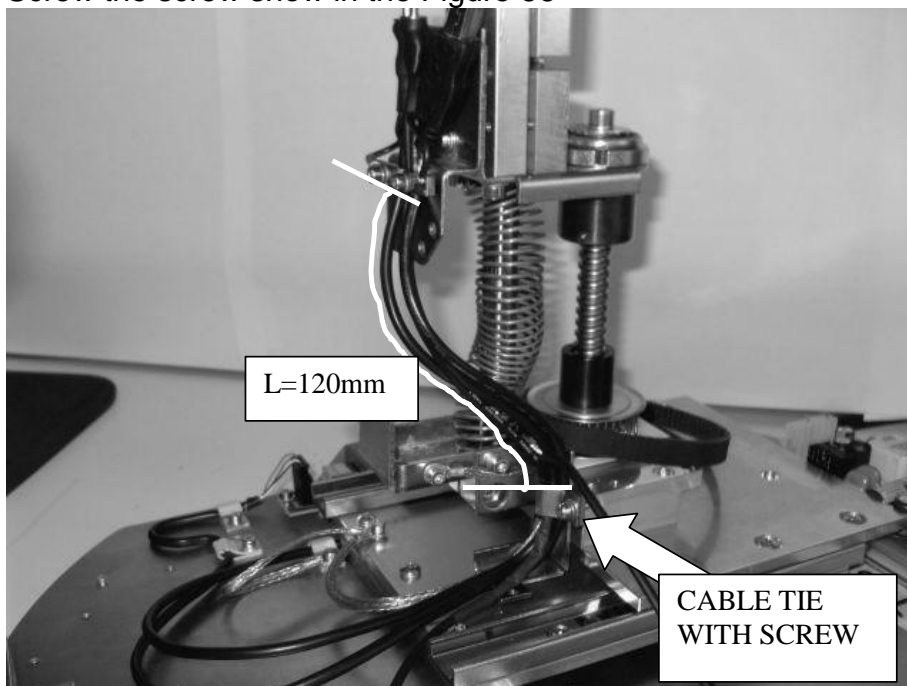


Figure 56 Length of cable

Pay attention of the length of MM2-WI002, L=165mm (see Figure 57)

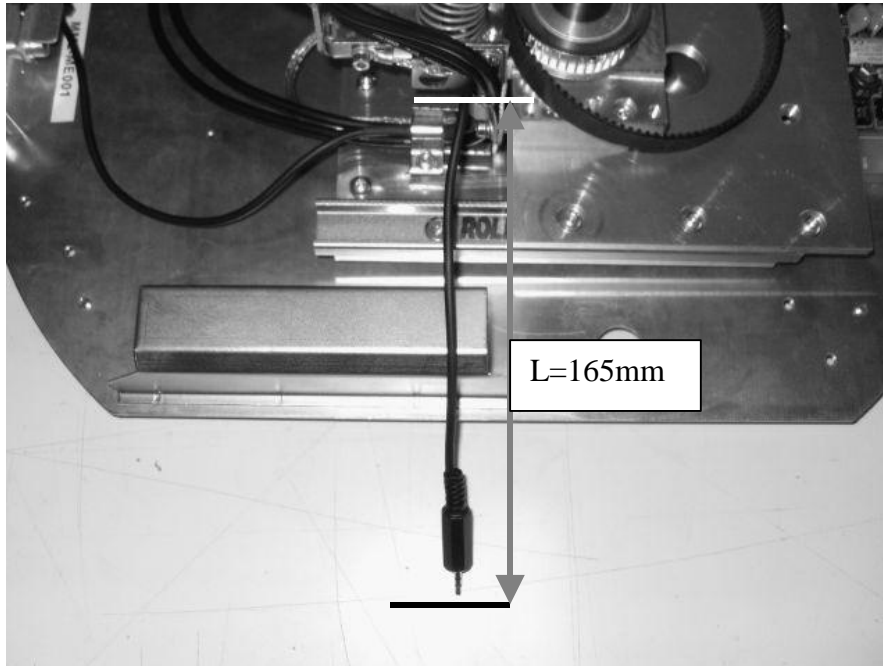


Figure 57 MM2-WI002

Assembly the cable tie (see Figure 58)

Pay attention: the cable must be nearest to the sheet in the point “1” (see Figure 58)

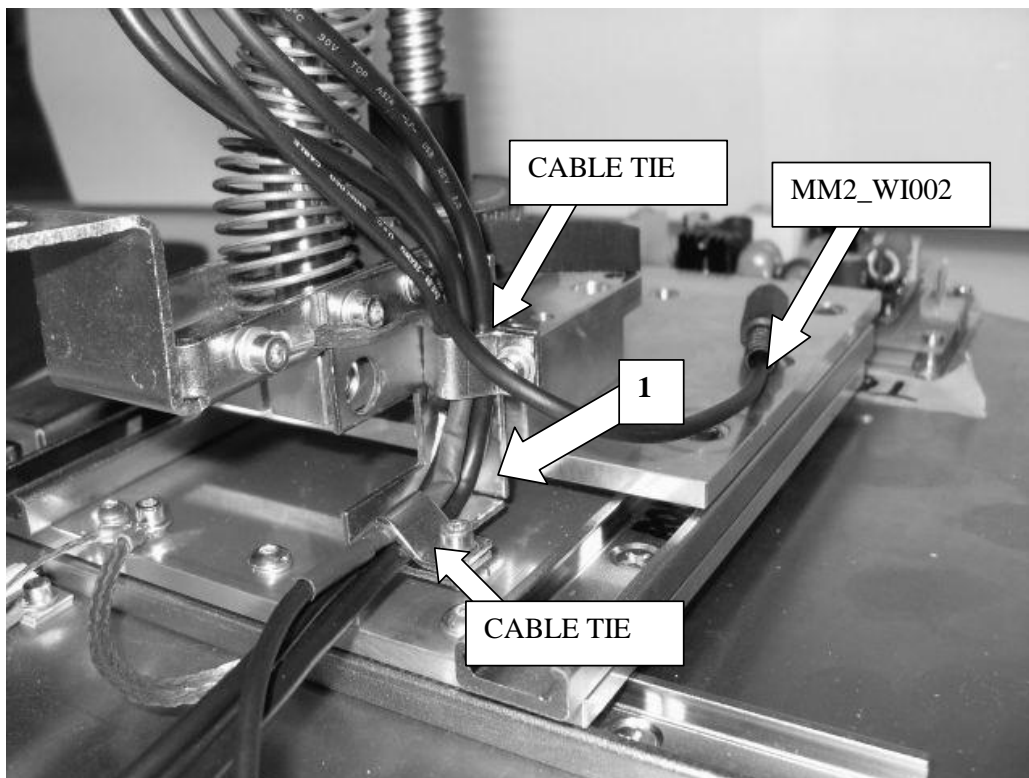


Figure 58 Position Of cable

3.20 Assembly rear support cable MM2-ME201

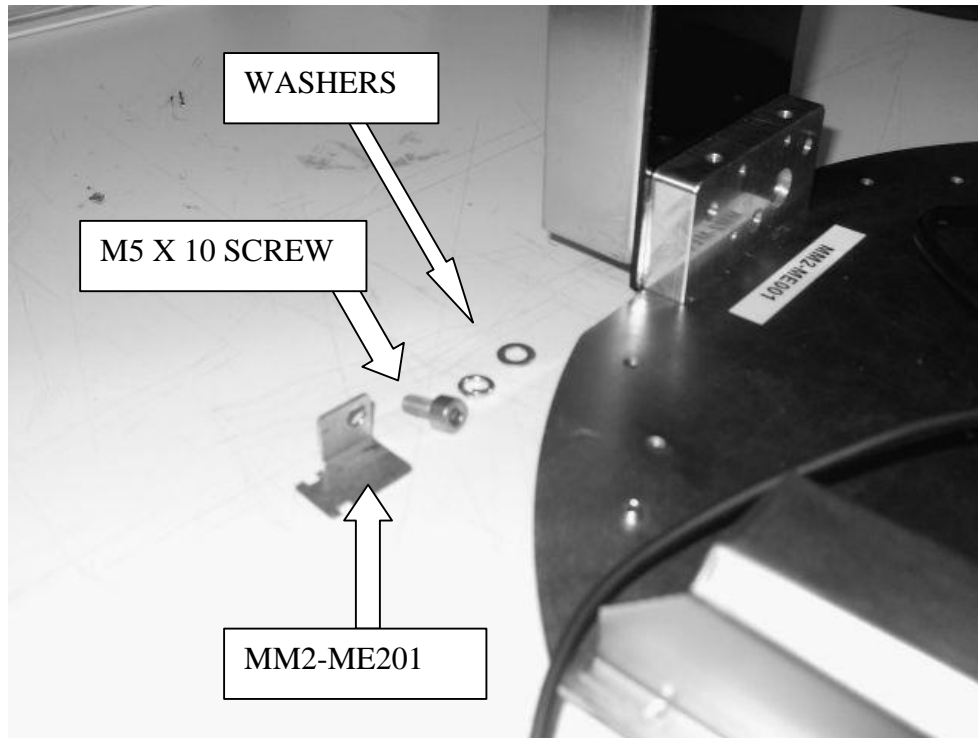


Figure 59 MM2-ME201 and screw

Assembly the cable support with M5X10 screw, lock washer and plain washer (see Figure 60)

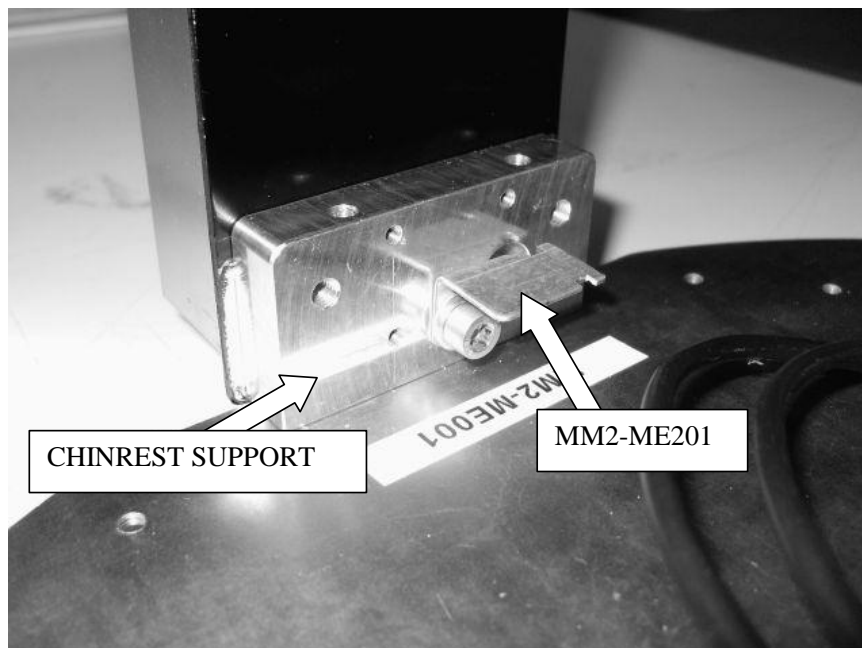


Figure 60 Chinrest support with MM2-ME201

3.21 Lock chinrest cable MM2-WI018 to rear support cable

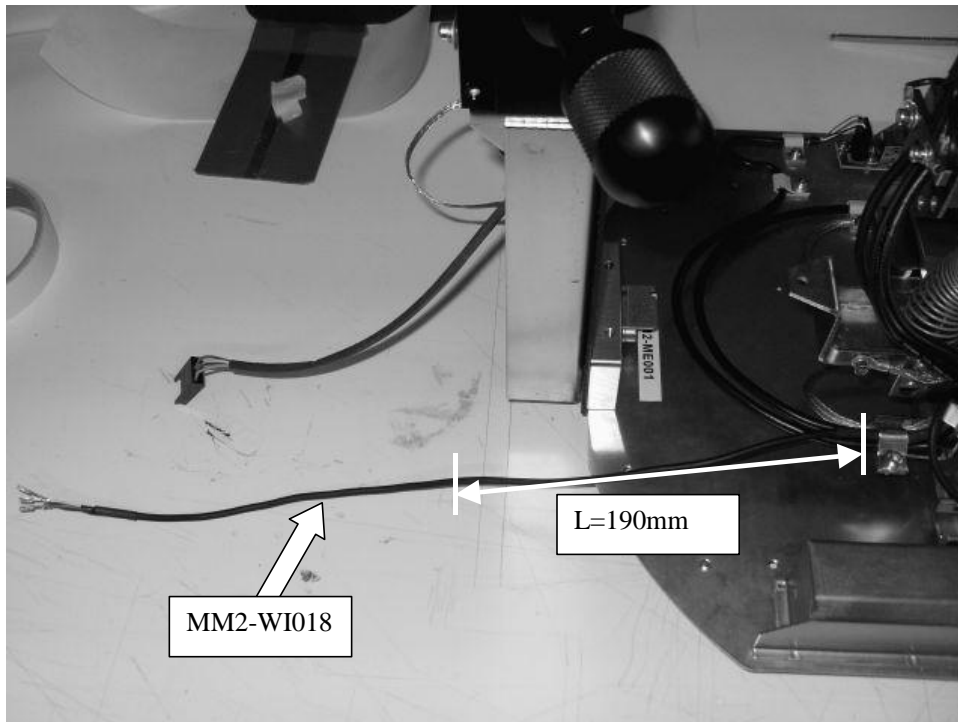


Figure 61 MM2-WI018

Pay attention of the length of cable MM2-WI018 (see Figure 61 and Figure 62)
Fix the chinrest cable MM2-WI018 with cable tie (see Figure 63 and Figure 64)
Pay attention of the position of the head of the cable tie (see Figure 64)

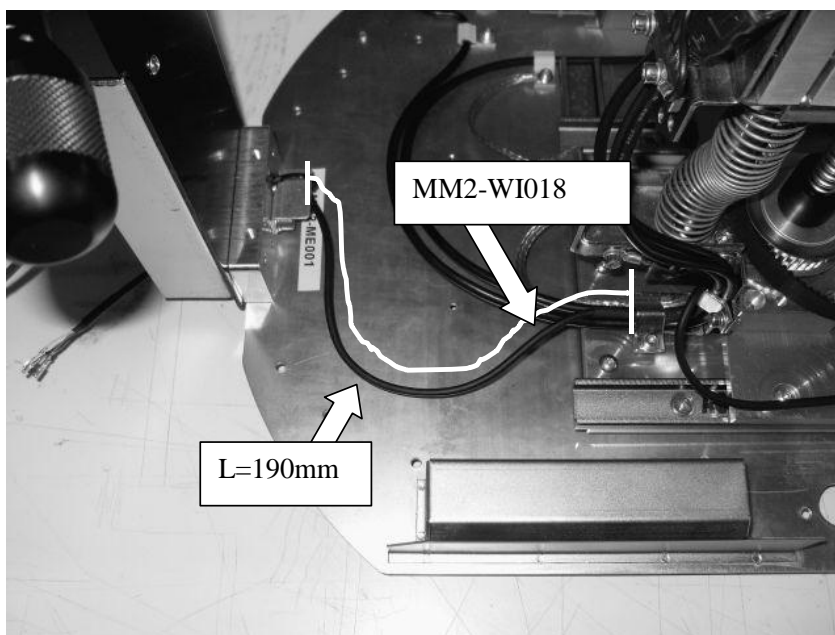


Figure 62 Fixing of MM2-WI018 cable

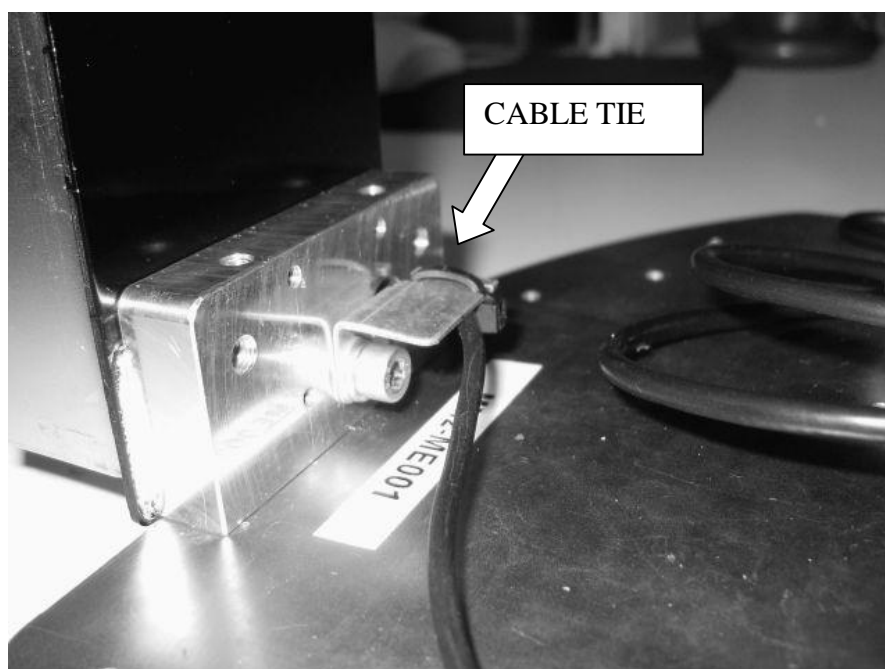


Figure 63 Fixing cable tie

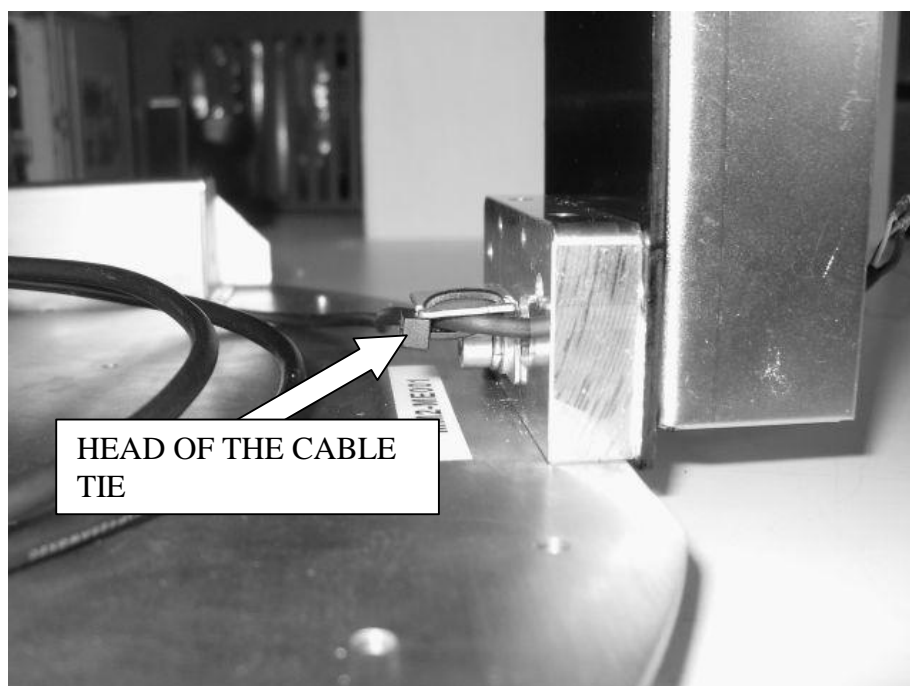


Figure 64 Cable tie

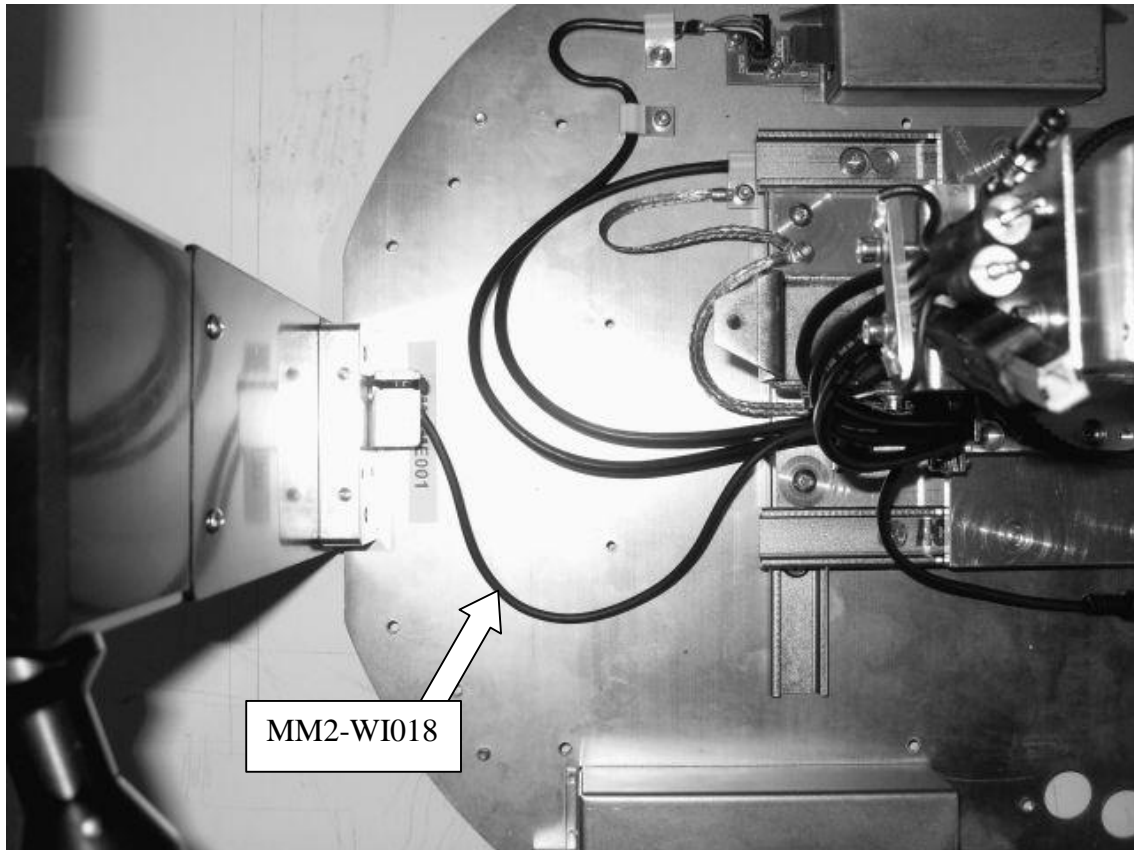


Figure 65 MM2-ME018

Assembly MM2_ME126 and screw the two screws (see Figure 66)

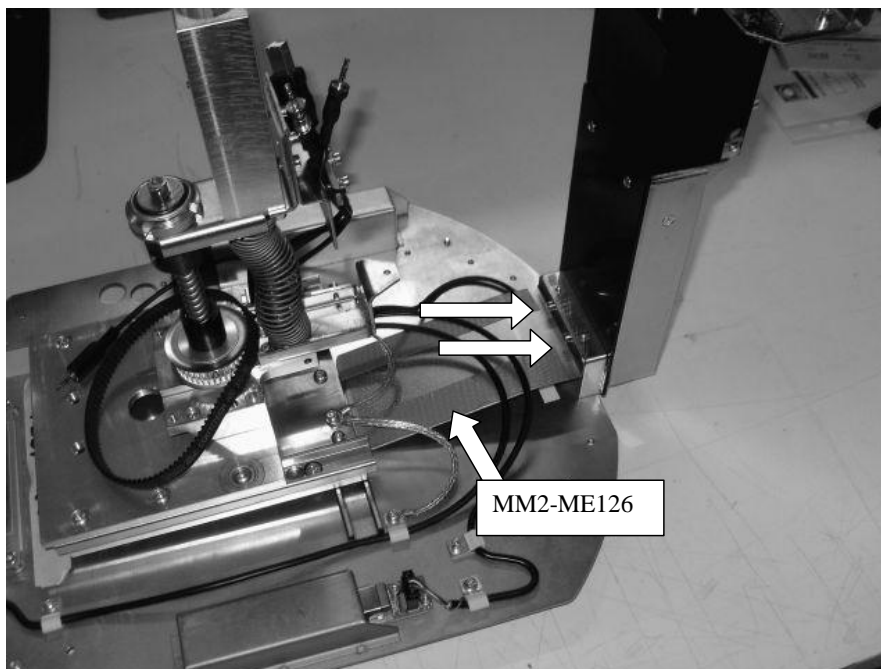


Figure 66 MM2-ME126

3.22 Connect two chinrest cable

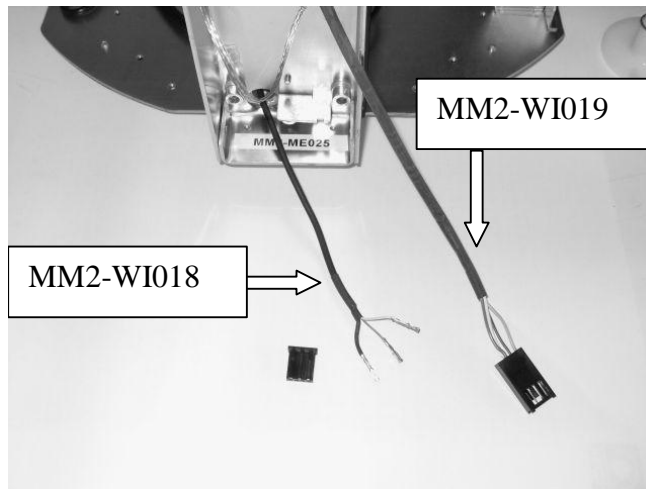


Figure 67 MM2-WI018 and MM2-WI019

MM2-WI018: Insert the pin in the Amp MODU housing (see Figure 68)

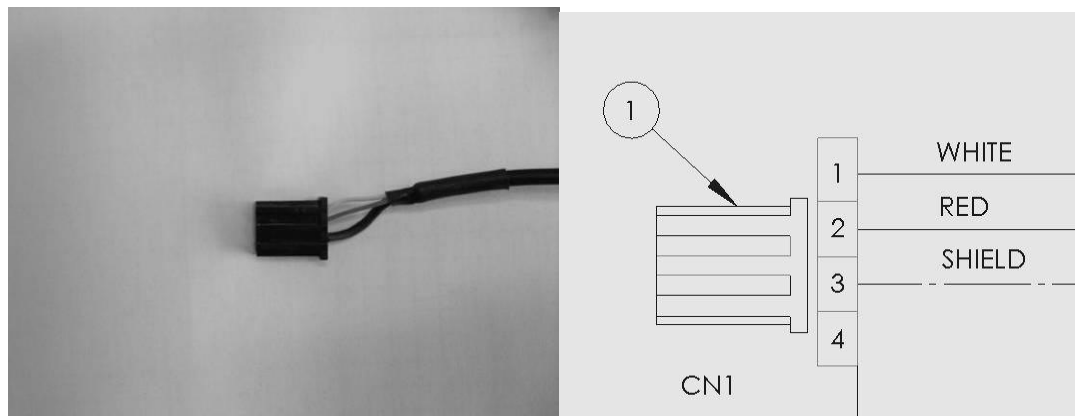


Figure 68 CN1 of MM2-WI018

Connect MM2-WI018 to MM2-WI019 (see Figure 69)
Fix the connector to support cable with cable tie

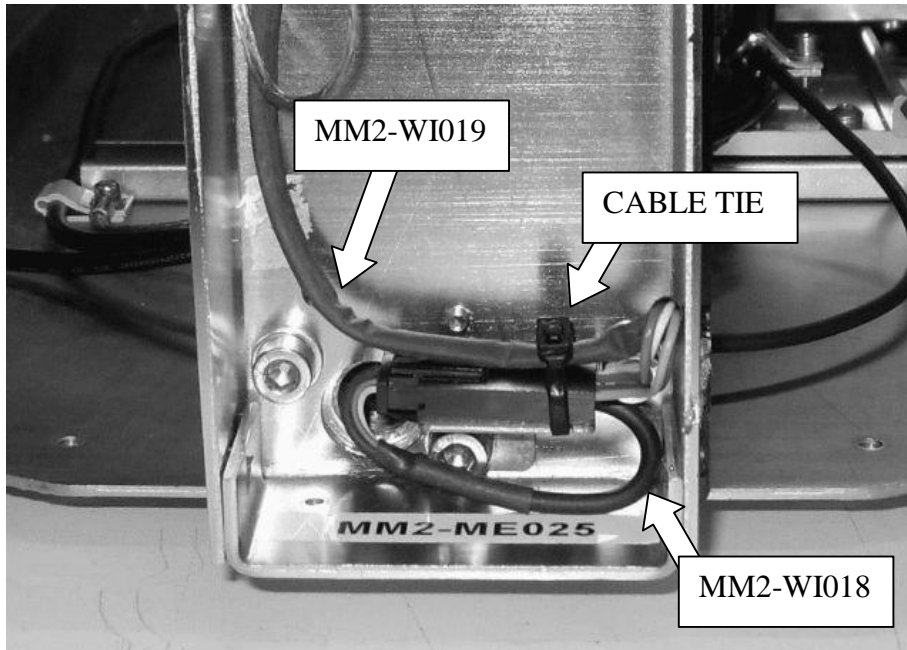


Figure 69 Fixing of MM2-WI018 and MM2-WI019

Verify the movement up/down of chinrest and cable (see Figure 70 and Figure 71)

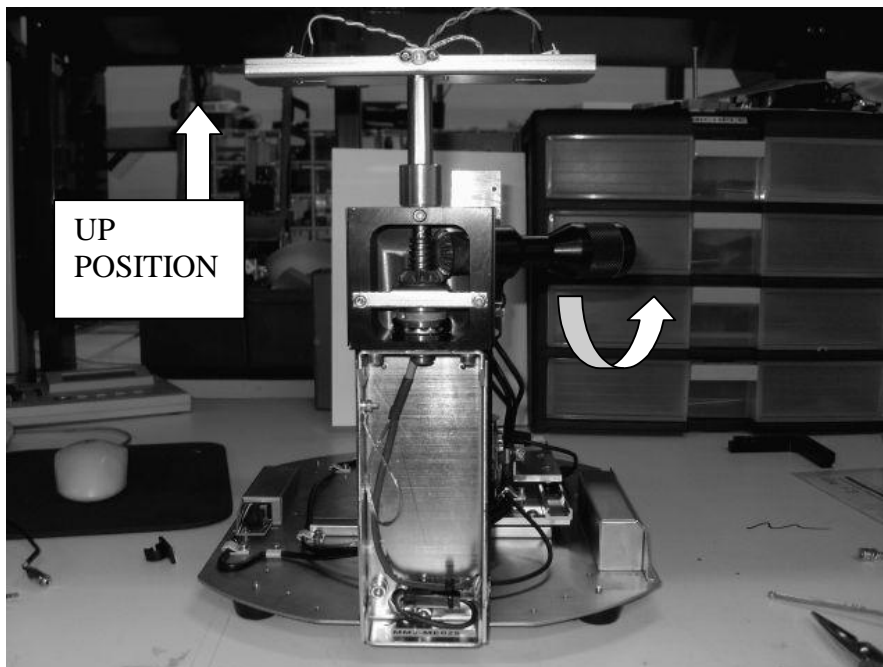


Figure 70 Up position of chinrest

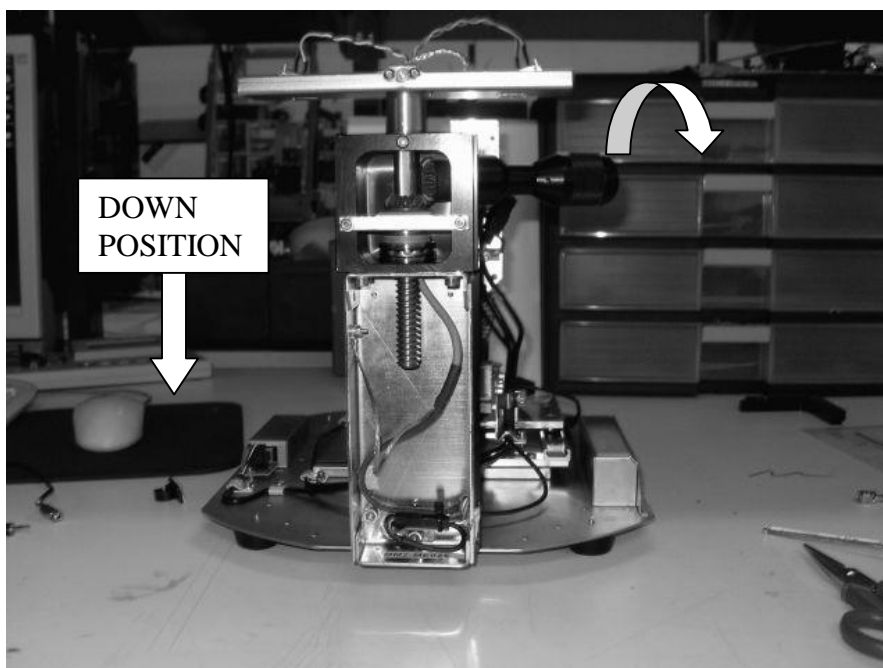


Figure 71 down position of chinrest

4 New CCD Camera Videology 21D389-USB

In the fig. below are showed the connection cables to the CCD camera 21D389-USB. The replacement of the camera can be performed only by Manufacturer Nidek Technologies S.r.l., as a dedicated calibration procedure is needed.

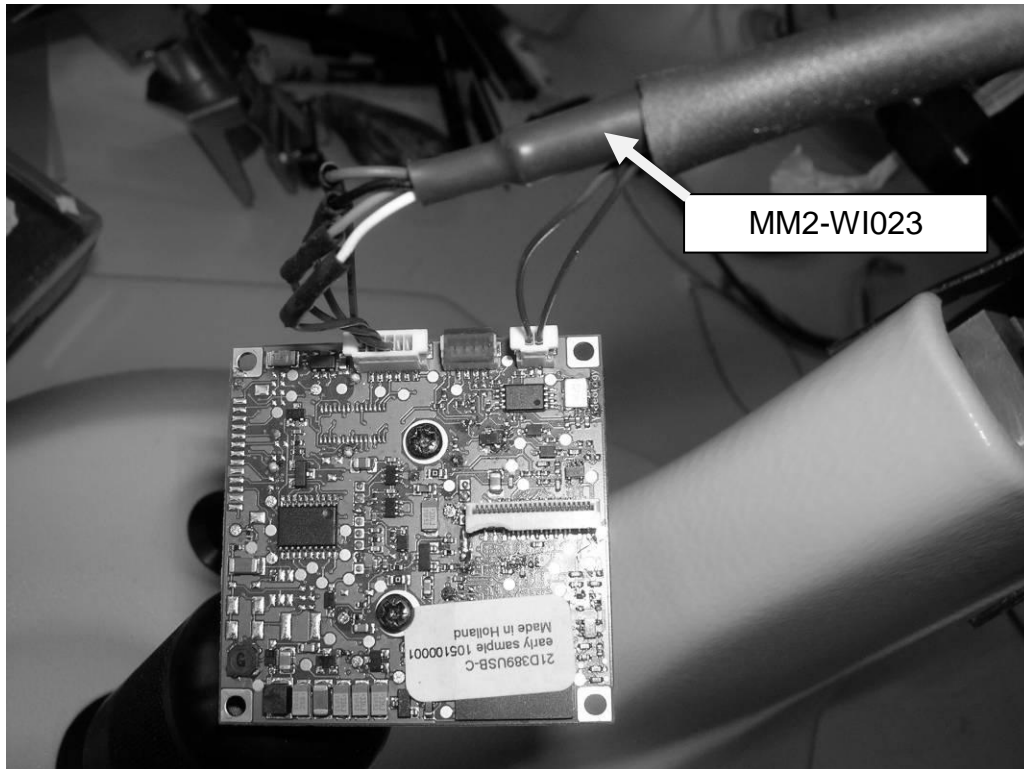


Figure 72 CCD Camera

5 HID & hub USB 2.0 Board.

View of the connection cable on the MAG-EL100 rev5

To change the board you only have to unscrew tree screws.

Old version that must be replaced, the board EL103 (frame grabber) under the previous, must be removed.

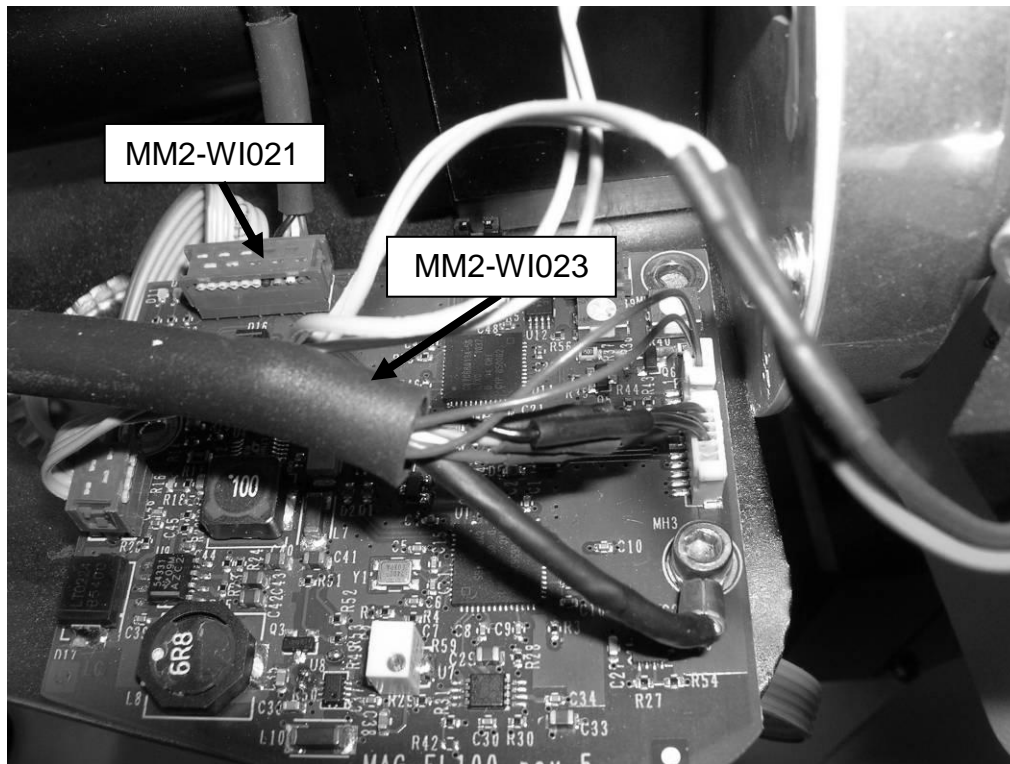


Figure 73 MAG-EL100 rev5

6 MAG-EL100 rev5

The cable WI021 must be pass through the hole on the head sheet metal.

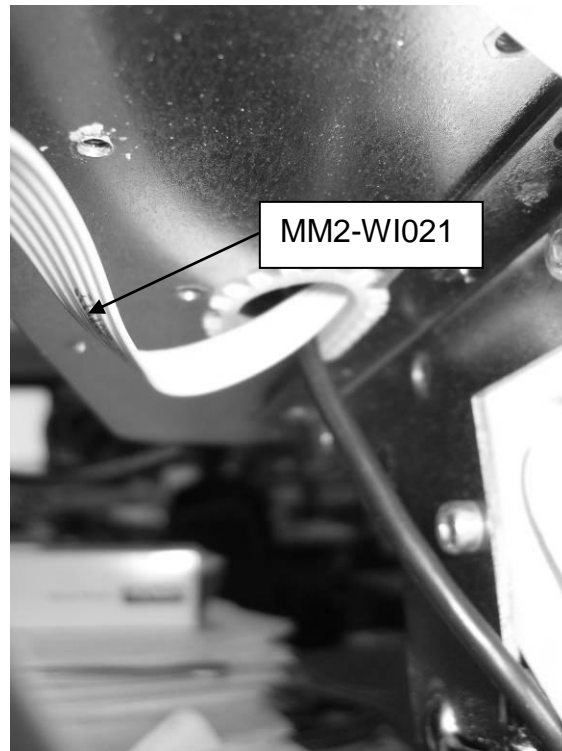


Figure 74 MM2-WI021

Then you must connect the cable MM2-WI021 to the MAG-EL102.
Pay attention to connect the ground cable.

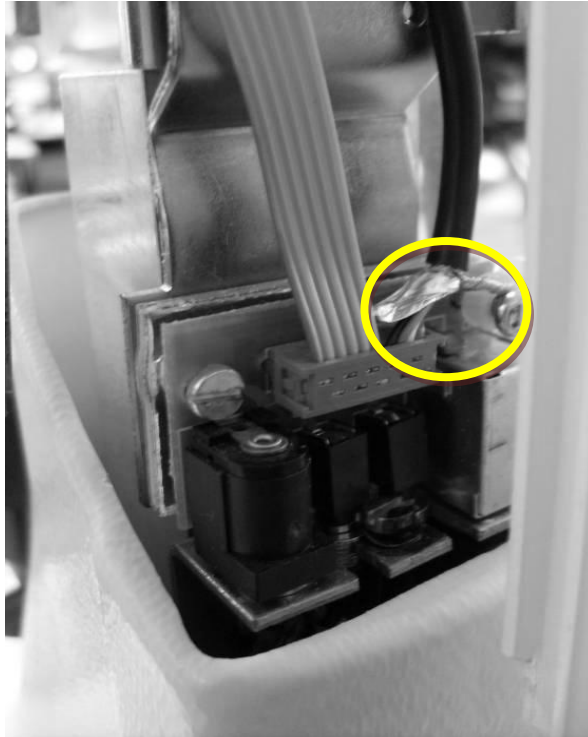


Figure 75 Ground

7 Replacement

Replace in reverse order, every removal procedures.

Final test

Functional Test

Check functionality of the laser.

Verify chinrest OD/OS detection.

Check functionality of the camera.

Check functionality of the led target.

Check functionality of the ring led.

Calibration test

Take the exam with calibration ball.

Verify the accuracy of the exam.

Exam test

Take exams with Magellan Mapper and verify in Navis.

Verify the accuracy of the exams.

8 Wiring

8.1 Cables List

MM2-WI002 rev1	Joystick bottom cable
MM2-WI004 rev2	USB bottom cable
MM2-WI005 rev2	LASER and rings cable
MM2-WI007 rev1	Target cable
MM2-WI008 rev8	Power bottom cable
MM2-WI018 rev0	Internal chinrest cable
MM2-WI019 rev1	Bottom chinrest cable
MM2-WI021 rev0	Head Board cable
MM2-WI023 rev0	Camera cable

8.2 Electronic Boards list

MM2-AP012	Power inlet assembly
MM1-AP034	Power supply assembly
MM2-EL012 rev1	Videology 21D389 USB
MM2-AP008	Joystick assembly
MM2-AP016	Chinrest assembly
MAG-EL102 rev2	Head connector board
MAG-EL100 rev5	HID & HUB USB 2.0
MM2-AP006	Keratoscope assembly
MAG-EL104 rev2	USB board

8.3 WD 1



Figure 76 WD WI002

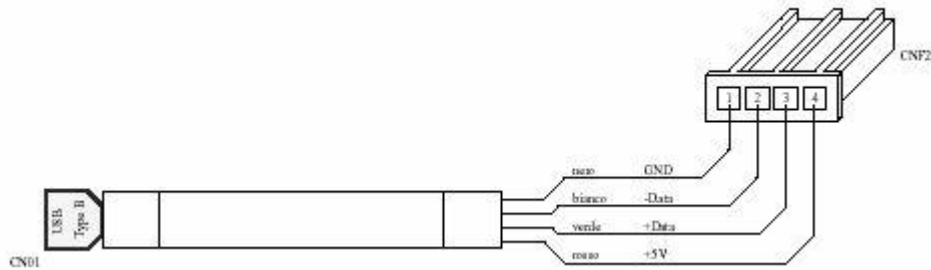


Figure 77 WD WI004

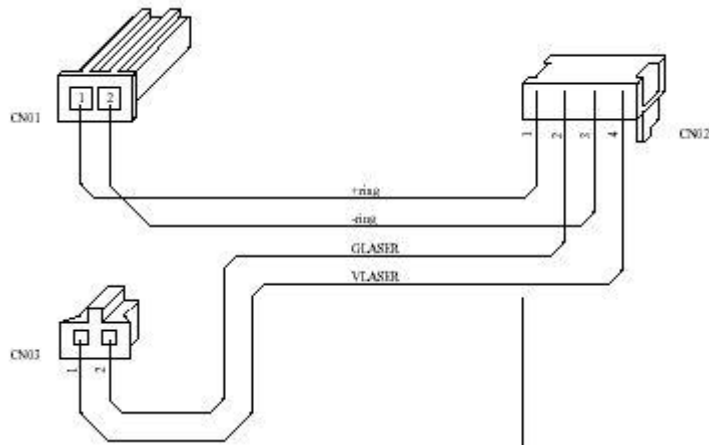


Figure 78 WD WI005

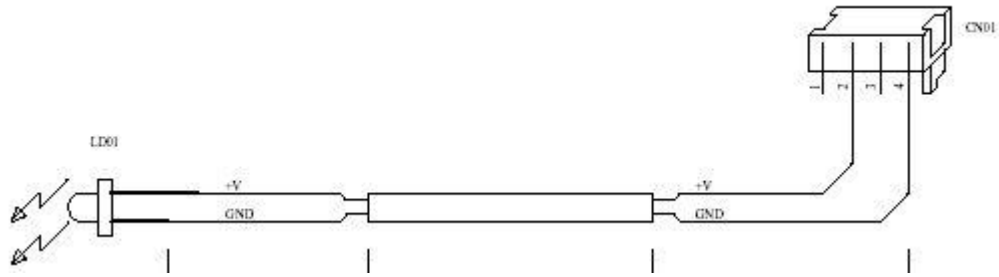


Figure 79 WD WI007

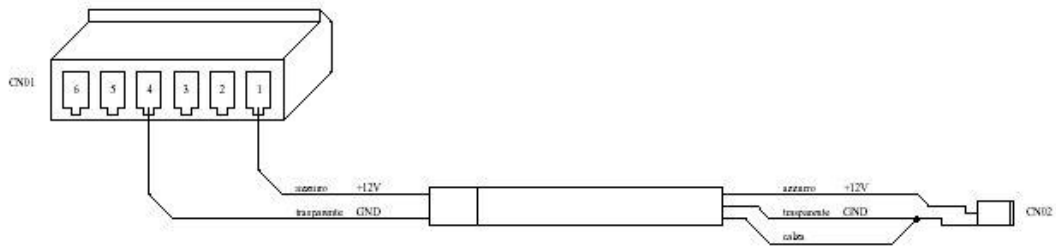


Figure 80 WD WI008

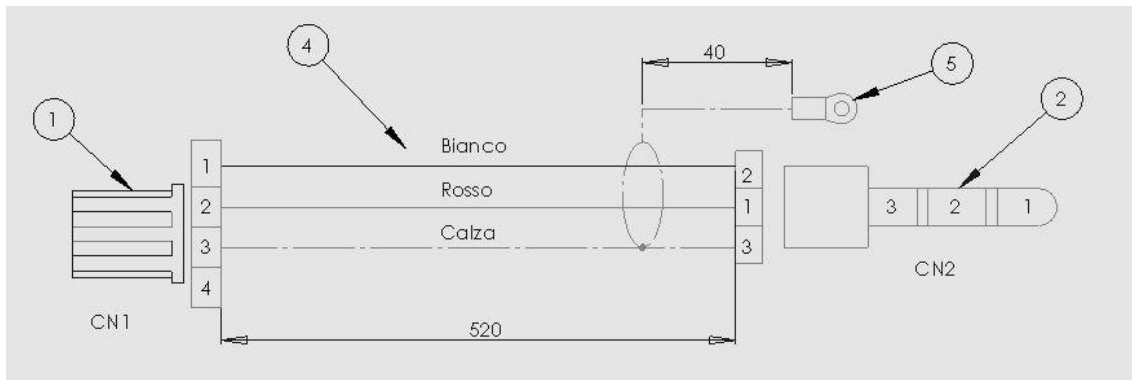


Figure 81 WD WI018

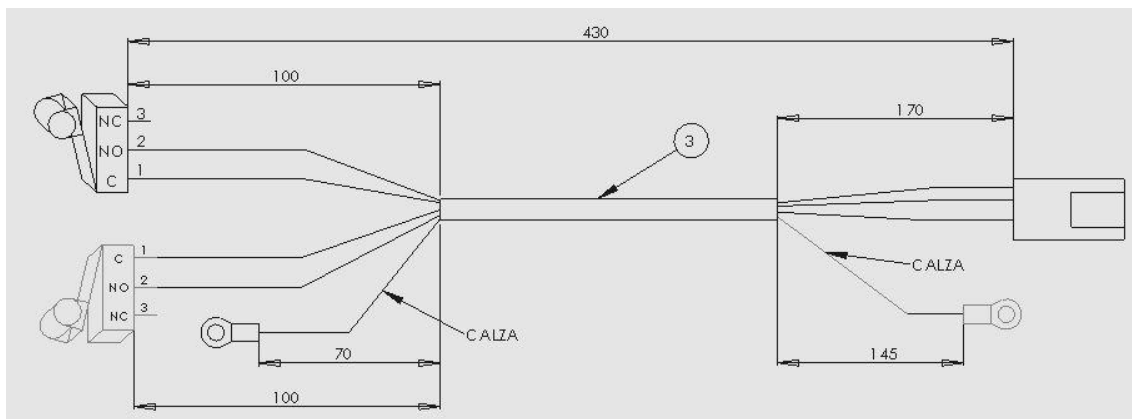


Figure 82 WD WI019

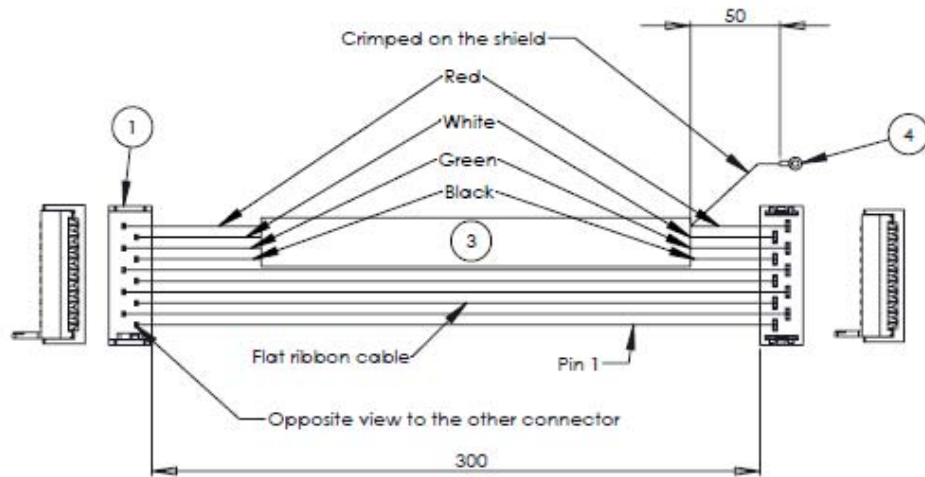


Figure 83 WI WI021

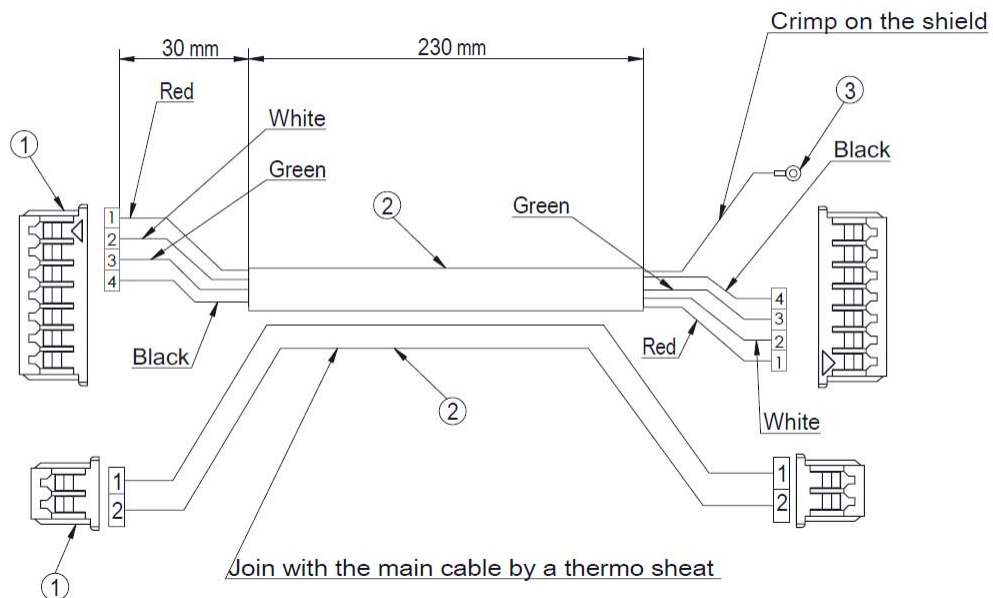


Figure 84 WI WI023

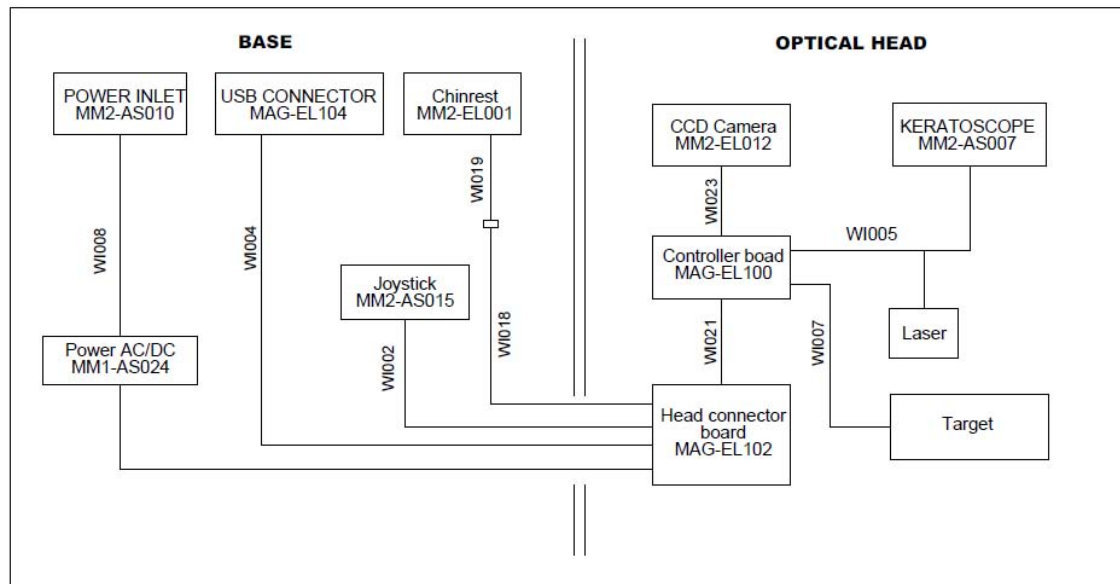


Figure 85 The WD complete wiring diagram.

9 Technical specifications

Class and Type

1B (according to IEC 601-1)

Power Supply

From 100 to 240 VAC; 50 / 60 Hz

Main switch

Compliance with IEC 60417-5007 "ON" (power) and IEC 60417-5008 "OFF" (power)

Detachable power supply cord

2 mm² – 100 -240 VAC – Compliance with IEC 227

Main Fuses

2x Type 5 x 20 mm, T (delayed)

1 Ampere (100 -240 VAC)

Breaking capacity: 1500A

Compliance with: EN60127.2.III / VDE 0820 / CEI 32.6.2 / BS 4265 / SEMKO 104 / DIN 41661

Power Consumption

25 W maximum

Lasers

1x Class 2 laser products

Max output 0.8mW at 635-670 nm

Electronically limited to 6uW

Weight of the unit

15 kg

Size

W30 x H49 x D47 cm–W11.5 x H19 x D18 Inch

Camera

Standard: PAL

Operative Environmental Conditions

Temperature: 15/38 C – 59/100 F

Atmospheric Pressure: 700 hPa - 1060 hPa

Relative Atmospheric Humidity: 30 % - 80 % not condensing

10 Tools

10.1 Special tools

Some services may need this device:

- Verification ball.

10.2 Service tools set

- Phillips screwdriver: small and middle
- Flat blade screwdriver: small and middle
- Nippers
- Small pliers
- Tester
- Allen wrench: 1,5 mm, 2 mm, 2.5 mm, 3 mm, 4 mm, 5 mm
- Socket wrench: 5 mm, 5.5 mm, 6 mm, 7 mm, 8 mm, 10 mm
- Electrician's scissor

11 Parts and assemblies list

Attention. Not all of these parts and assemblies are on the field replaceable.

ITEM	PART NO.
Verification Ball	MM2-AP007
Controller board	MAG-EL100 rev5
Head connector board	MAG-EL102 rev2
USB connector	MAG-EL104 rev2
Power supply assembly	MM1-AP034
Keratoscope assembly	MM2-AP006
Power inlet assembly	MM2-AP012
Joystick assembly	MM2-AP008
Chinrest assembly	MM2-AP016
CCD camera	MM2-EL012 rev1
Joystick bottom cable	MM2-WI002 rev1
USB bottom cable	MM2-WI004 rev2
LASER and rings cable	MM2-WI005 rev2
Target cable	MM2-WI007 rev1
Power bottom cable	MM2-WI008 rev1
Chinrest bottom cable	MM2-WI018 rev0
Board cable	MM2-WI021 rev0
Camera cable	MM2-WI023 rev0
Optical HEAD assembly	MM2-AS009
CCD camera and support assembly	MM2-AP005
Robot assembly (axes XYZ)	MM2-AP009-AP010

Contact **Nidek Technologies Service** to order the above spare parts:



Eye & Health Care

NIDEK TECHNOLOGIES Srl

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35020 Albignasego (PD) – ITALY

Phone: +39 049 8629200
Fax: +39 049 8626824
Email: nidektechnologies@nidektechnologies.it
Web: www.nidektechnologies.it

Table of Figure

Figure 1 Location A.....	6
Figure 2 Location B.....	6
Figure 3 Location C.....	7
Figure 4 the left head cover screws.	9
Figure 5 the left head cover.....	9
Figure 6 the right head cover screws.	10
Figure 7 the right head cover.....	10
Figure 8 the head cover retainers.	11
Figure 9 the cover retainer insertion slot.....	11
Figure 10 the Front ring.	12
Figure 11 the head cover support bracket.	13
Figure 12 the four screws of support bracket.	13
Figure 13 the Optical head before removing.	14
Figure 14 the optical head assembly.	15
Figure 15 the S screw: it holds the head.	16
Figure 16 How to insert the connectors.....	17
Figure 17 the moving base cover installed.	18
Figure 18 the knob of moving cover.	18
Figure 19 the nuts and screw of moving cover.	19
Figure 20 the moving base cover.....	19
Figure 21 the two screws of chinrest base cover.	20
Figure 22 the chinrest base cover.	20
Figure 23 the four screws and belt stretcher.	21
Figure 24 the joystick.....	22
Figure 25 the joystick plug and belt.....	23
Figure 26 the five screws of plastic base cover.....	24
Figure 27 the plastic base cover.	25
Figure 28 the twelve screws of metallic base cover.	26
Figure 29 the metallic base cover.	27
Figure 30 View of the base	28
Figure 31 Chinrest support	29
Figure 32 Chinrest mechanism	29
Figure 33 MM2-WI003 cable.....	30
Figure 34 chinrest and MM2 WI019 cable	31
Figure 35.....	31
Figure 36 Position of micro switch.....	32
Figure 37 Chinrest.....	32
Figure 38 down position of micro switch.....	33
Figure 39.....	33
Figure 40 Chinrest.....	34
Figure 41 Central position of micro switch	34
Figure 42 Upper position of micro switch (OFF)	35
Figure 43 CN1 of MM2-WI019.....	35
Figure 44 Connector CN1 of MM2-WI019	35
Figure 45.....	36
Figure 46 MM2-ME201 and screw	37
Figure 47 MM2-ME201 and screw	37
Figure 48 Chinrest support	37
Figure 49 cable near the Head.....	38
Figure 50 MM2-WI010 removed	38
Figure 51.....	39
Figure 52.....	39
Figure 53.....	40
Figure 54.....	40

Figure 55 Length of cable	41
Figure 56 Length of cable	41
Figure 57 MM2-WI002	42
Figure 58 Position Of cable.....	42
Figure 59 MM2-ME201 and screw	43
Figure 60 Chinrest support with MM2-ME201	43
Figure 61 MM2-WI018	44
Figure 62 Fixing of MM2-ME018 cable.....	44
Figure 63 Fixing cable tie	45
Figure 64 Cable tie.....	45
Figure 65 MM2-ME018	46
Figure 66 MM2-ME126	46
Figure 67 MM2-WI018 and MM2-WI019.....	47
Figure 68 CN1 of MM2-WI018.....	47
Figure 69 Fixing of MM2-WI018 and MM2-WI019	48
Figure 70 Up position of chinrest.....	48
Figure 71 down position of chinrest	49
Figure 72 CCD Camera.....	50
Figure 73 MAG-EL100 rev5.....	51
Figure 74 MM2-WI021	52
Figure 75 Ground.....	53
Figure 76 WD WI002	56
Figure 77 WD WI004	56
Figure 78 WD WI005	56
Figure 79 WD WI007	57
Figure 80 WD WI008	57
Figure 81 WD WI018	57
Figure 82 WD WI019	57
Figure 83 WI WI021	58
Figure 84 WI WI023.....	58
Figure 85 The WD complete wiring diagram.....	59